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1892

BRITISH JOURNAL

OF

DENTAL SCIENCE.

VOL. XXXVIII.

JANUARY—DECEMBER, 1895.

LONDON :

289 & 291, REGENT STREET, W.

British Journal of Dental Science.

No. 647. LONDON, JAN. 1, 1895. VOL. XXXVIII.

GENERAL PATHOLOGY AND SURGERY FOR DENTISTS.

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F.R.C.S. (Eng.)

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(*Continued from page 1112.*)

DISEASES OF BONE

Under this heading we must include diseases not only of bone itself, but also of the periosteum and medullary membrane.

PERIOSTITIS.

Inflammation of the periosteum of a bone may be due to local causes, such as injury, the irritation of a neighbouring tumour, the pulsations of an aneurysm, the presence of inflammation in the subjacent bone or neighbouring joint, or to general causes such as struma, syphilis and rheumatism, or to the action of specific micro-organisms.

The pathological changes which take place in the beginning are simply those of inflammation; the outer fibrous layer swells up and becomes redder than natural, whilst the cells of the osteogenetic layer proliferate and loosen the attachment of the membrane to the bone. The inflammation may lead to the following *results* or *terminations*.

(a) *Resolution.* When the cause has been a local one and has been removed or has ceased to act, the inflammatory process may subside and the parts return to their normal condition.

(b) *Suppuration.* Acute periostitis, especially when of septic origin, may lead to the formation of an abscess between the periosteum and the bone. Chronic periostitis may produce the same result in persons whose tissues are reduced to a low condition of vitality by syphilis or tuberculosis. Periosteal suppuration is often followed by death of a portion of the bone (see necrosis).

(c) *Formation of new bone.* In chronic periostitis the activity of the osteogenetic layer is increased, so that an excessive quantity of new bone is deposited. The new bone may take the shape of a smooth rounded elevation (*a node*), or of sharp pointed stalactytic processes (*osteophytes*).

Symptoms. In acute periostitis there is very severe throbbing pain. The affected part is swollen and tender on pressure. If suppuration occurs the skin becomes red and œdematous, and a soft spot develops in the midst of the inflammatory hardness. In chronic periostitis the pain is less severe, but the swelling is very hard and unyielding owing to the formation of new bone; the skin is of normal colour, unless a chronic abscess forms, in which case it becomes dusky and mottled. In making a diagnosis in a case of periostitis, the cause of the disease must be discovered; in syphilis the pain is nearly always much worse at night; in rheumatism it varies in time, severity, and situation; in struma it is comparatively slight. Confirmatory symptoms must be looked for in other parts of the body.

Treatment. The cause of the disease must be dealt with whenever this is possible. When the periostitis is of syphilitic origin a course of iodide of potassium should be given; when rheumatic, salicylates or the iodide of potassium; and

when strumous, cod-liver oil and iron. Any local source of irritation must be removed. The local treatment varies with the condition of the inflamed part. Rest is always desirable, and sometimes essential. If the inflammation is acute it must be subdued by cooling lotions or local blood-letting by means of leeches. If there is any chance of suppuration occurring, and *a fortiori* if it has already occurred, an incision must be made through the soft parts right down to the bone so as to give free exit to all inflammatory exudation, for any such accumulation, by lifting the periosteum from the bone, deprives the latter of a part of its blood supply and endangers its vitality. In chronic osteoplastic periostitis the most useful local remedy is a succession of blisters.

OSTEITIS.

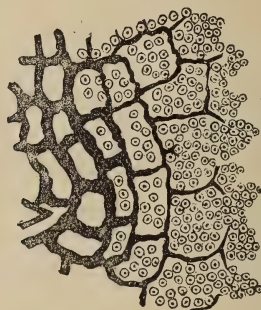
Inflammation of bone is essentially the same process as inflammation of soft parts, but the hard and unyielding nature of bone modifies to a certain extent the symptoms and effects of the disease.

Causes. The constitutional causes of osteitis include all conditions of impaired general health, especially the strumous diathesis. The local causes include injury, extension of inflammation from neighbouring parts, the deposit of tubercle, the formation of gummata, and the action of various micro-organisms.

Morbid anatomy. The first change is *congestion*; this is soon followed by *exudation* of inflammatory lymph, the small round cells of which find their way between the lamellæ of compact bone and into the spaces of cancellous bone. The inflammatory process thus started may terminate in one of the following ways:—

1. *Resolution.* The inflammatory exudation becomes absorbed before it has had time to do any material damage to the bone, and the latter returns to its normal condition.

2. *Rarefaction.* The inflammatory exudation separates the bone lamellæ from one another and expands the cancellous spaces (see Fig. 21), so that the bone becomes more porous or spongy. This change is produced in two ways, partly by the mechanical pressure of the exudation, and partly by erosion or eating away of the bone lamellæ and trabeculæ. The erosion is effected chiefly by large multinucleated cells called *osteoclasts*, which seem to have the power of dissolving out the bone salts, thus eating out little crescentic spaces in the bone called *Howship's lacunæ*. It is not certain whether the osteoclasts are derived from the blood or from the connective-tissue corpuscles of the bone.



a.

b.

c.

Fig. 21.—RAREFYING OSTEITIS AND CARIES OF CANCELLOUS TISSUE.

(a) Normal Cancelli.

(b) Rarefying Osteitis.

(c) Caries.

3. *Caries.* The process of rarefaction may go on until some of the trabeculæ or lamellæ are completely eaten away; this constitutes caries (*vide infra*).

4. *Osteo-Sclerosis.* The inflammatory exudation becomes converted into bone, the result being that the bone is event-

ually much denser, harder, and heavier than it originally was. This change is analogous to the fibroid thickening that follows chronic inflammation of soft parts.

5. *Suppuration.* The inflammatory exudation may break down and form pus (see abscess of bone).

6. *Necrosis.* When the inflammatory process is severe, it may lead to death either of the whole bone affected or of some considerable portion of it. This is called necrosis (vide infra).

Symptoms of Osteitis. The symptoms closely resemble those of periostitis, and the two conditions are frequently, indeed usually, present together.

Treatment of Osteitis. This is the same as for that of periostitis. The treatment of the results of osteitis will be given with the description of caries, suppuration of bone, and necrosis (which see).

CARIES.

Caries of bone is essentially the same process as ulceration of soft parts. It is one of the terminations or results of osteitis, and is prone to occur when the osteitis depends on struma, tuberculosis or syphilis, or occurs in a person who is in a low state of general health from any other cause. It is more common in cancellous than in compact bone, affecting especially the bodies of the vertebræ, the carpus and tarsus and the ends of the long bones.

The nature of the process will be best understood by referring to Fig. 21. The thick black lines to the left of the diagram represent normal bone trabeculæ, and between them are the spaces or cancelli which are occupied by marrow (the marrow is not represented in the diagram). Passing to the right, the spaces are seen to grow larger and to contain inflammatory exudation, whilst the trabeculæ become thinner from absorption (*ravifying osteitis*). To the right of the diagram the trabeculæ have completely disappeared, and

there is nothing but granulation tissue (*caries*). Under favourable conditions the granulation tissue may ossify, and a sclerosis result. In the great majority of cases, however, the inflammatory material undergoes caseous degeneration or forms pus, which may find its way either to the surface of the body or into a neighbouring joint. Sometimes caries continues for a long time without either leading to ossification or to suppuration, this condition is called *caries sicca*. Sometimes a small piece of cancellous tissue dies *en masse*, instead of molecule by molecule; when caries and necrosis are thus associated the condition is called *caries necrotica*, (see Fig. 22). In caries the result of tuberculosis the inflammatory exudation is especially prone to caseate, the bone is

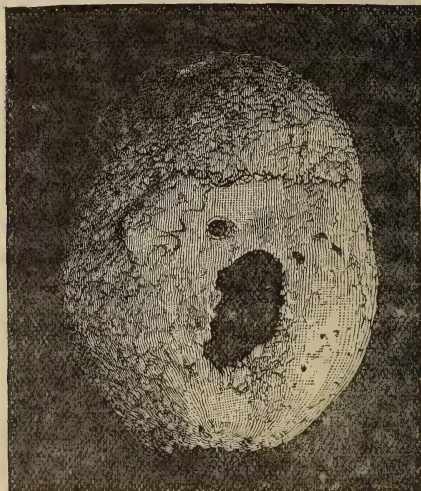


Fig. 22.

SYPHILITIC CARIES AND NECROSIS OF SKULL.

(Museum of St. Mary's Hospital.)

soft, greasy, crumbling, and extensively destroyed, and there is little or no tendency to repair. Giant cells and tubercle bacilli may be discovered in the inflammatory exudation.

Symptoms. An abscess forms in connection with a bone which has been for some time inflamed. The abscess instead of healing, dwindles down into a sinus, the orifice of which is usually surmounted by a crop of oedematous granulations, and gives exit to thin watery pus. A probe passed down the sinus impinges on soft friable bone.

Treatment. Remove the cause when possible and improve the general health. When the caries is in an accessible part, the diseased bone must be scraped or gouged away, and the cavity thus made allowed to granulate up. When there is extensive caries of a long bone, or of the foot or hand, excision or amputation may be required.

ABSCESS OF BONE.

Abscess of bone is usually chronic and situated in the cancellous ends of the long bones. It commences as a rarefying osteitis leading to caries of a circumscribed patch of cancellous tissue. The broken-down bone trabeculae become replaced by feeble granulation-tissue which degenerates into pus. The granulation tissue lining the abscess cavity is sometimes partly organized forming a sort of membrane to which the name "pyogenic membrane" is sometimes applied. The surrounding bone may be sclerosed. When the abscess comes near the surface of the bone, it gives rise to osteoplastic periostitis, and the new bone thus formed may prevent its bursting on the surface; this is not the case, however, when it comes near the articular surface of a neighbouring joint, for here there is no periosteum, and consequently no osteoplastic process; hence the tendency of these abscesses to burst into the joint rather than on to the surface. When an abscess in bone has formed quickly, it often contains a small crumb of necrosed cancellous tissue.

The symptoms are usually chronic and obscure; there is a dull boring pain in the affected part; the pain is intermittent

and worse at night. The skin over the affected spot may be œdematous, and there is tenderness on pressure. The neighbouring joint may be inflamed from time to time.

The treatment consists in opening the abscess with a trephine or gouge, and scraping the granulation-tissue away, rendering the cavity aseptic and allowing it to granulate up.

NECROSIS.

Necrosis is death of a piece of bone *en masse*. It corresponds to gangrene or sloughing of soft parts. Inflammation is more apt to be followed by death of the affected part when it occurs in bone than when it occurs in soft parts, because in the former, owing to the unyielding nature of the tissue, the blood vessels are compressed by the inflammatory exudation. For the same reason necrosis is more frequent in compact than in cancellous bone. Necrosis is more apt to follow acute inflammation than chronic.

The immediate *cause* of necrosis is deprivation of blood supply; a bone receives blood from two sources, from its nutrient artery, and from the periosteum covering it, hence when the periosteum is separated by injury or disease, the outer or superficial layers of the bone are apt to die (*peripheral necrosis*), and when the nutrient vessels in its interior are blocked or compressed, the central portion of the bone suffers, (*central necrosis*). When both periosteal and endosteal vessels are occluded the result is death of the whole thickness of the bone, (*total necrosis*). The commonest conditions interfering with the blood supply of bone, and producing necrosis, are injury (such as compound fracture, stripping off of periosteum, etc.), syphilitic osteitis, and periostitis, the specific fevers, and poisoning by mercury or phosphorus. The bones most commonly necrosed are the tibia, femur, lower jaw and skull.

[The piece of bone which dies is called the *sequestrum*; it

is hard, dry, bloodless, and, unless exposed to the air, white ; its free surface is smooth, its margins ragged, its previously attached surface rough and worm-eaten.

The separation of the sequestrum from the living bone is effected by the process of ulceration. The irritation produced

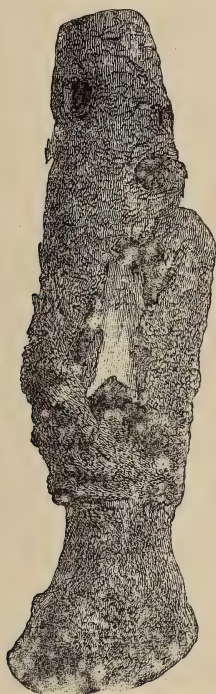


Fig. 23.

NECROSIS OF FEMUR.

The sequestrum is enclosed in a thick involucrum of periosteal new bone-perforated by cloacæ.

(Museum of St. Mary's Hospital.)

by the presence of the sequestrum sets up inflammation in the adjacent living bone ; a layer of granulation tissue is formed at the line of demarcation between the living and the dead bone ; the leucocytes and osteoclasts slowly dissolve or

eat away the opposed surfaces of both the living and the dead tissue, so that when the process is complete, the dead bone is loosened from its attachments. When the sequestrum is on the surface of the bone, it comes away spontaneously when the process of separation is complete (*exfoliation*), but when the sequestrum is central or involves the whole thickness of the bone, it is usually imprisoned in a dense irregular case of new bone (*involucrum*) formed by the periosteum. The involucrum is perforated by several large apertures (*cloacæ*) through which pus escapes (see Fig. 23). When the sequestrum is thus *invaginated* its release is practically impossible without surgical interference. After the escape or removal of the sequestrum the cavity which is left is slowly filled up by granulations, which ossify and replace the lost bone.

Symptoms. The symptoms of necrosis are always preceded by those of the injury or inflammation of which it is the result. When suppuration has occurred and the pus has been evacuated either by natural or artificial means, there remains a sinus through which a probe can be passed, and the dead bone examined, when it is found to present the characters already described ; the process of separation of the sequestrum may be known to be complete when the latter can be moved by the probe.

Treatment. The sequestrum must be removed as soon as the process of separation is complete. When the necrosis is superficial, removal of the sequestrum can generally be easily effected by means of suitable forceps, but when the dead bone is invaginated to any great extent by new bone, it may be necessary to enlarge the *cloacæ* by saws or cutting forceps, a proceeding which is sometimes tedious and difficult, so much so indeed that not unfrequently amputation must be resorted to. After removing the sequestrum the cavity remaining must be rendered aseptic and allowed to granulate

up. The general condition of the patient must also receive careful attention.

OSTEO-MYELITIS.

Osteo-myelitis is inflammation of the marrow of bone. It may be acute or chronic ; the acute variety may be localized or diffuse.

Acute localized Osteo-myelitis is usually the result of an injury exposing the medullary cavity of a bone, such as compound fracture or amputation. The inflammation may terminate either in resolution, or in localized central necrosis.

Acute diffuse osteo-myelitis is dependent on the action of bacteria. There are two chief varieties. (a) The *Septic* variety. This occurs after compound fractures and operations on bones when the parts have not been kept aseptic, i.e. they have become inoculated with saprophytic bacteria from without. (b) The *infective* variety. This is of the nature of a specific infective fever, and is due to the presence of bacteria (streptococci and staphylococci) in the blood, which have a special tendency to attack bones the vitality of which has been lowered by any local or constitutional cause; the periosteum and the bone itself are also inflamed at the same time (see Infective panosteitis). In both the septic and the infective variety, the inflammation spreads along the whole length and thickness of the bone, and leads to diffuse suppuration ; the veins in the interior of the bone participate in the process, and become blocked by infective or septic thrombi, which may be carried to distant parts, giving rise to general pyæmia.

Symptoms. The symptoms of infective osteo-myelitis are the same as those of infective panosteitis (which see). In the septic variety there is high fever and swelling and œlema of the limb ; the wound looks unhealthy, and the periosteum

recedes, leaving the bone bare; from the open medullary cavity a fungating mass of granulation protrudes.

Treatment. In the septic variety the choice lies between amputation and scraping out the inflamed medulla. For the treatment of the infective variety, see infective panosteitis.

Chronic osteo-myelitis is hardly to be distinguished from osteitis, with which it is practically always associated.

INFECTIVE PANOSTEITIS.

This disease has received various names, such as diffuse periostitis, acute necrosis, etc. As the disease affects not only the bone, but also the periosteum and medulla, I have called it "panosteitis" (inflammation of all the parts of bone); the adjective "infective" is added to the name because the disease is due to the action of infective bacteria.

It usually occurs in debilitated children, and affects a bone the vitality of which has been lowered by exposure to cold, or some slight injury. Authorities differ as to whether the disease begins in the medulla and spreads to the periosteum, or *vice versa*, but all agree that both are soon affected. The periosteum becomes stripped from the bone by an accumulation of pus beneath it, whilst the nutrient vessels in the medulla are compressed by the inflammatory exudation inside the bone. The result is that a large portion, sometimes the whole, of the diaphysis dies. The epiphyses usually escape, because they have a separate set of nutrient arteries and the periosteum covering them is more adherent and therefore less easily stripped off; sometimes, however, the disease spreads to the neighbouring joints. Owing to the involvement of the veins of the medulla, pyæmia may occur and kill the patient (see infective osteo-myelitis). Should recovery occur, the necrosed shaft becomes encased in periosteal new bone (see necrosis.)

Symptoms. The disease begins by high fever, often

accompanied by rigors and delirium. The local signs may at first be obscure, so that it is not uncommon for the disease to be mistaken for acute rheumatism or some other febrile disease. Such a mistake is a serious calamity, for the proper treatment is delayed, and the effects of the disease are consequently more extensive and apt to prove fatal. The local signs, however, become sooner or later sufficiently obvious; the affected part becomes intensely painful, and swollen and oedematous; the signs of blood-poisoning supervene, and death ensues from pyæmia, unless the proper treatment can be successfully carried out.

Treatment. As soon as the nature of the disease has been discovered, a free incision must be made right down to the bone. Usually it will be found that pus has stripped up the periosteum to a considerable extent. If the incision has anticipated this condition, so much the better for the chance of the patient's recovery. Every means must be adopted to get the parts aseptic and to keep them so. If the patient escapes the dangers of pyæmia, the dead bone must be removed as soon as it is loose. Throughout the whole course of the disease, the patient's strength must be maintained by suitable nourishment, stimulants and tonics.

SUMMARY OF INFLAMMATION OF BONE.

Before dismissing the subject it will be well to remind the student that although osteitis, osteo-myelitis and periostitis have been separately considered for convenience of description, yet they often co-exist in the same bone at the same time.

The stages and results of osteitis may be summarized:

Congestion and Exudation	{ Resolution	
	{ Osteo-Sclerosis	
	{ Rarefaction—Caries	
	{ Necrosis	

{ Osteo-Sclerosis
Suppuration

(To be concluded).

DENTAL MECHANICS.

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THE DENTAL LABORATORY.

In selecting a room to fit up as a laboratory, one must be guided by certain considerations highly essential for the comfort and well-being of its occupants.

Firstly, it should be spacious enough to contain the bench, lathes, furnaces or stoves, rollers, and other necessary things, and yet afford room to move about freely.

Secondly, it should be lofty, well ventilated, have a good light, and be situated on the ground floor. These are the requirements needed, for no one can do satisfactory work if not in good health : and an easy way to lose that essential is to work in a badly ventilated room, filled with foul air and the deleterious products of combustion of gas, etc.

So much for the room ; and now to furnish it.

To get through the work quickly and well, it is requisite that all the appliances necessary for one's use should be at hand, and easily found without appreciable loss of time. There ought to be a place for everything, and everything should be replaced after use.

THE WORK-BENCH AND ITS CONSTRUCTION.

The most suitable woods for making a dental work-bench are birch, beech, or American pine ; the last named is perhaps the best, as it can be obtained in widths of one, two, or three feet, and in thickness as desired. Two inches is a fair thickness ; getting the wood in one piece makes a considerable difference both in time and labour in its construction.

The wood is first of all planed on its upper surface, and then a series of sections are cut out; this enables the workman to approach nearer to his work and also allows more bench room. (Fig. 1.) Some workmen suspend a sheep's-skin from one side of this semicircular space to the other, the object of which is to catch anything that may be dropped, to retain a few tools, and to hold trays for the reception of filings, etc. Such a skin, however, soon becomes the receptacle for all sorts of odds and ends, and should be avoided by the skilful workman in favour of the nest of drawers to be described further on.

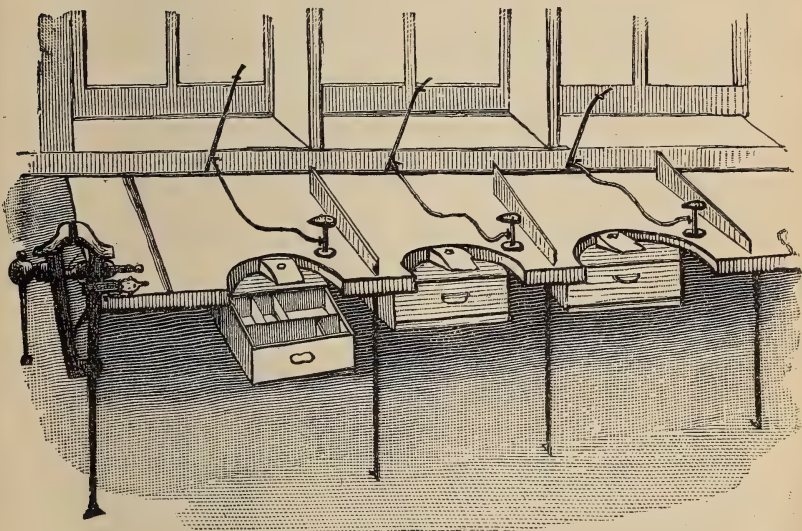


Fig. 1.

The bench should be firmly fixed to the floor, by means of brackets attached to its legs, and should also be fastened to the wall when possible, in order to have that amount of steadiness and rigidity necessary to withstand the strain exerted when using the vice.

Its height from the floor should be about three feet; this

will allow the workmen to sit down and work without stooping, a very necessary thing to be taken notice of, especially with a pupil entering on his apprenticeship; he should be made to sit so that his back is perfectly straight, it prevents him acquiring a stooping habit, and is conducive to the preservation of his general health.

The legs of the bench may either be made of wood or iron; if the latter is selected then the tubing sold at the ironmonger's under the name of "gas barrel" is very suitable for the purpose. It can be obtained cut in suitable lengths, allowing three inches at each end to be flattened and bent at right angles in order to get the necessary hold for the screws. To bend the ends of the tube it should be placed in a fire and made red hot, and while in that state should be flattened on an anvil, and then bent at right angles. It should then be heated again and three holes punched in each end with a steel punch of a suitable size; these three holes are for the screws.

The legs are now ready to be screwed to the bench and floor, and make excellent supports, taking up but a small amount of room.

The bench should be fitted with nests of drawers, (see Fig. 1), corresponding to the number of seats required by the workmen.

The upper drawer should be deepest and divided into sections to accommodate the tools, etc. Thus, in one compartment are placed the files, in another the sculptors, in another pliers and nippers, and so on, while one small division is left for odds and ends, drills and clamps, too small to mix up with the other tools.

The lower drawer being shallow should be lined with brown paper, pasted on, or the joints may be filled in with putty to prevent any leakage through them. This drawer is pulled out to catch the gold dust and other *debris*, while plates are

being filed at the bench-pin. This latter is a wedge-shaped piece of wood, usually beech, about three inches wide, and one inch thick where it joins the bench, is six inches long and is bevelled in front to a sharp edge. It is fixed horizontally into the edge of the bench by means of a slot cut into the latter with a morticing chisel, and so adjusted that the upper surface of the pin is flush with the top of bench.

The object of the bench-pin is to afford a suitable support for the work to rest against while being filed. There is often a round hole drilled in the centre of it, for the reception of a small beak-iron used in adjusting clasps to difficult curves and for flattening wire.

It is necessary now to attach a vice to one corner of the bench, that being usually the most convenient and handy place : and it should be securely fixed both to the bench and (in the case of a leg-vice) to the floor also. For dental purposes the leg-vice is the most useful ; it is not so expensive as the parallel one, nor so likely to get out of order with the rough usage that it will meet with.

To protect the edges of the jaws of the vice, they should be covered with pieces of thick lead bent at right angles ; these protection pieces in no way interfere with the use of the vice, but serve to keep the jaws sharp and free from flaws.

Our next work is to adjust the necessary gas apparatus for heating and lighting purposes. This is not a formidable or difficult undertaking if we only proceed in a business-like manner.

Nothing makes better or more durable gas fittings than "gas barrel." It can be procured in any length or size, and tapped with a thread at the ends, ready for fixing. All one has to do is to get, according to the number of the seats at the bench, a corresponding number of brass "three-way pieces." These are to connect the lengths of barrel together

opposite each bench, and to give the necessary adjustment for the two taps that are to supply each seat with light and a soldering flame. (See Fig. 1).

There are various burners for soldering purposes, but the general principle of each is to produce a large soft flame; some of these burners are open at the ends, others have a chamber at the end filled with iron wire through which the gas passes, while the same purpose is arrived at in others by having a cap (such as that represented in Fig. 1) perforated with a number of fine holes.

Now that the bench is supplied with its soldering flame (which I would here remark ought to be placed within convenient reach of the artist while sitting down), one must take into consideration the various blowpipes and the special advantages connected with each. For himself, the author prefers the simple taper brass tube about 10 inches long, bent at right angles at the end, and with the mouthpiece covered with a silvered ferrule or rubber tube to prevent the lips coming into contact with the brass; these can be procured at any dépôt or tool shop. Anyone brought up to the use of this simple appliance can do the work efficiently and well, regulating the flame to the greatest nicety. It takes some little time to get into the use of it, but it is generally found that after a while by practice, the expenditure of breath can be so regulated that it becomes quite a simple matter to prolong the blowing for a considerable length of time without fatigue; in fact quite long enough to complete the soldering of any dental plate. The learning to blow and take in air while expending it through the blowpipe is only to be gained by constant use. On the other hand, there are many who do not seem to have the capacity to learn the use of it, or perhaps are physically incapable of expending the amount of breath necessary; for such, the mechanical blowpipe of Mr. Fletcher is perhaps the best; that requires some

practice to use properly, but it has the advantage that it dispenses with the use of the mouth and lungs.

Our next work is to furnish the laboratory with the appliances necessary for melting both the precious and coarser metals, and a description of the furnace designed by the author to fulfil these requirements may not be out of place here. It has for a recommendation the fact that it will stand the hardest work, and will melt anything up to ten pounds of cast iron ; it is at the same time very inexpensive and comparatively easy to construct."

It stands 27 inches high, and is 15 inches square, so that when allowing two and a half inches for thickness of fire-bricks, it gives an inside diameter of 10 inches, and a depth of 15 inches.

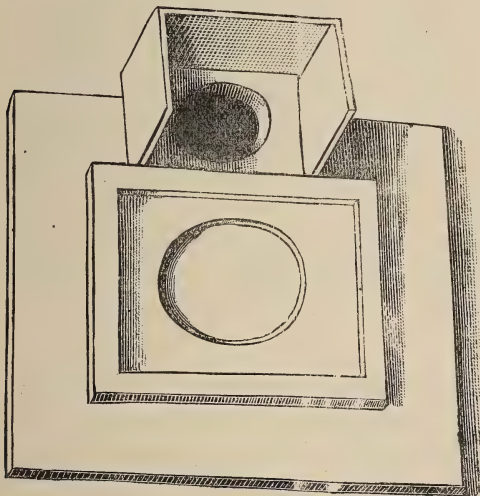


Fig. 2.

The outer case is formed of sheet iron, and can be obtained at any good ironmonger's upon supplying him with a diagram and measurements.

The case is rivetted together at the back, and the inside, si

lined with firebricks coming up to, and level with, the top of the case.

The top of the furnace is made of a single casting (Fig. 2) with a round hole cut out of the centre, for a smaller lid to fit on to and close in, and at the back part of the iron casting is a raised rim to carry the flue. The whole furnace presents a neat and compact appearance. (Fig. 3).

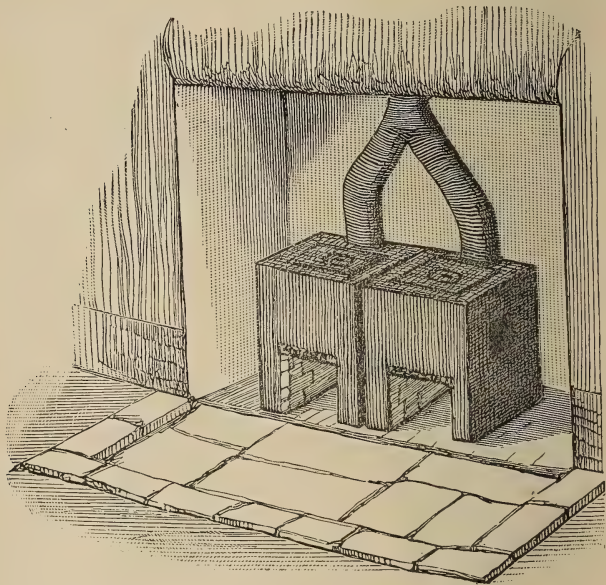


Fig. 3.

By referring to the Figure it will be seen that a portion of the iron case in front is removed to allow of a good draught, but still a sufficient portion is left to cover and support the brick lining. At the upper part of this aperture a thick bar of iron passes across from each side, both back and front, resting on and let into the firebricks; these are to support the furnace bars.

The firebricks are fitted into their places and joined together with soft fire-clay.

The flue is made of ordinary iron piping supplied for that purpose, and can be adjusted to any grate.

The top of the furnace may be used for boiling water, drying models, and various other useful purposes. A modification of this furnace is used for baking mineral teeth and continuous gum-work, the difference being an opening cut out of the side of the iron jacket (see Fig. 3), to allow of the introduction of a muffle. In this case the fire-clay bricks are so fitted that they form a recess for the back and front portion of the muffle to rest on. The muffle should also be supported along its whole length by firebricks resting on two

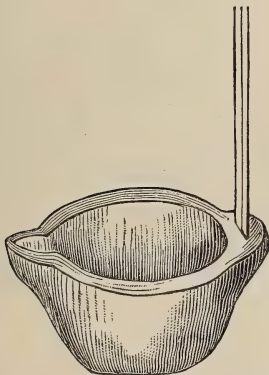


Fig. 4.

of the furnace bars, which bars should be fixtures. The fuel used for these furnaces is the ordinary gas coke, unless a prolonged heat is required, when the heavy furnace or foundry coke is mixed with it ; this however, only applies when the muffle furnace is needed to bake artificial teeth, and when a high temperature is required for a long time and it is not desirable to disturb the fire.

The ladles for melting zinc and lead (see Fig. 4) are made of cast iron, about half an inch thick with an upright handle cast on ; this handle is placed in position in the mould when

the iron is poured, and is thus fixed to the cast-iron bowl. This handle one must supply to the founder when the mould is given in to the foundry.

The pattern of the mould for such a ladle could be obtained from any wood-turner for a shilling or two, and will in time save pounds, for these ladles last six or seven times as long as those of wrought iron.

The size of the ladle should be regulated by the opening in the top of the furnace, that is to say it should be small enough to withdraw from the furnace without a risk of spilling its contents, and the handle should be of such a length as not to get too hot to hold comfortably when in the furnace.

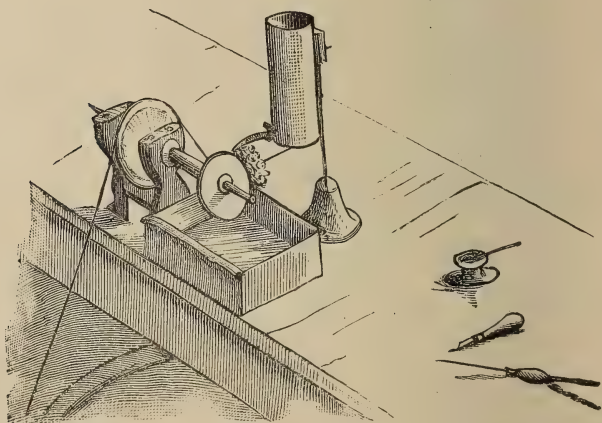


Fig. 5.

A bench to carry lathes (Fig. 5) for grinding and polishing is our next consideration, and this any carpenter can make in the course of a few hours. The lathe-bench may be about four feet long and one and a half feet wide; it will carry five lathes, two on one side and three on the other, one being a polishing lathe; this latter should be placed at the end so as not to be in the way of the other four.

The kind of lathe-head that the author recommends for

fitting teeth is the cone-journal; it runs true and steady, and the chucks are fine enough to carry the smallest button wheel equally as well as the largest.

It is furnished with a chuck that will carry an ordinary engine bur; this is a great advantage in "fine-fitting" tube teeth, and much better work can be done with a lathe of this kind than with the heavy old-fashioned dentists' lathe, because any looseness arising from wear can be taken up at once.

The polishing lathe should carry a long square chuck working on a centre (see Fig. 6) this is to carry two or three

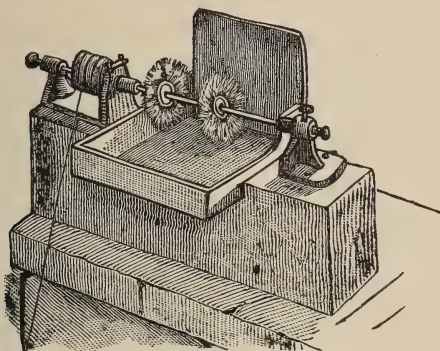


Fig. 6.

brushes, two for pumice (one being stiffer than the other to get a surface on the plate) and a soft one for polishing with whitening or rouge. The chuck crosses a box which forms a receptacle into which the polishing material falls as it is thrown off the brushes. This box should be made strong and watertight to retain the damp pumice, which can be used several times over. The mandril to carry the brushes being four-sided, it is necessary to cut a square hole in the hub of the brush, (this can be done in a few minutes with a flat sculptor) the shape of the hole preventing the brush turning. The mandril is also fitted with several pieces of loose brass tubing; these being placed between the brushes to separate

them, the whole is held in position with an adjustable screw at the end of the chuck.

Each of the lathes for grinding must have a small cistern made of zinc or lead to fit under the wheels, the edge of the cistern being rounded (see Fig. 5) in order to form a support for the hand to rest on when using the wheel, and should also have a water supply to moisten a piece of sponge which the corundum wheels should come in contact with, for if the wheels are used without water they get hot, the shellac that binds the corundum particles together becomes fused and the surface too slippery to cut at all.

The lathe-bench should be placed in a good light, and have a gas supply ; this bench should be furnished with a camel's hair pencil ; a small pot containing a paint made of carmine, or vermilion, and oil : a needle file to clean out tubes ; and a chamfering tool made of a small round file, cut into three facets at the end, in order to countersink the edges of the hole in the tube tooth, where it will come into contact with the solder round the pin. A chipper (Fig. 7) to reduce tube, or long teeth, should also be affixed to it. These articles should be always kept in one place, for much time may be wasted in looking about for them and they are very often required.

The lathe-heads having been described, we now require driving wheels to set them going. The usual fault with lathe wheels is that they are too small, the larger and heavier the wheel the less labour there is in working the lathe.

Such a wheel may be mounted on cast iron bearings and attached to a wooden frame so that it can be moved to any position required. The gut band for driving is obtained from any good tool shop, or depot, and the ends are joined together by means of a steel hook and eye. Some little care is required in screwing these on so as not to cut the gut ; it is better to have the hook and eye of sufficiently large a bore to form a thread on the gut without cutting it. When the

is screwed through, a red hot iron wire should be made to perforate the holes in order to clear them, and at the same time

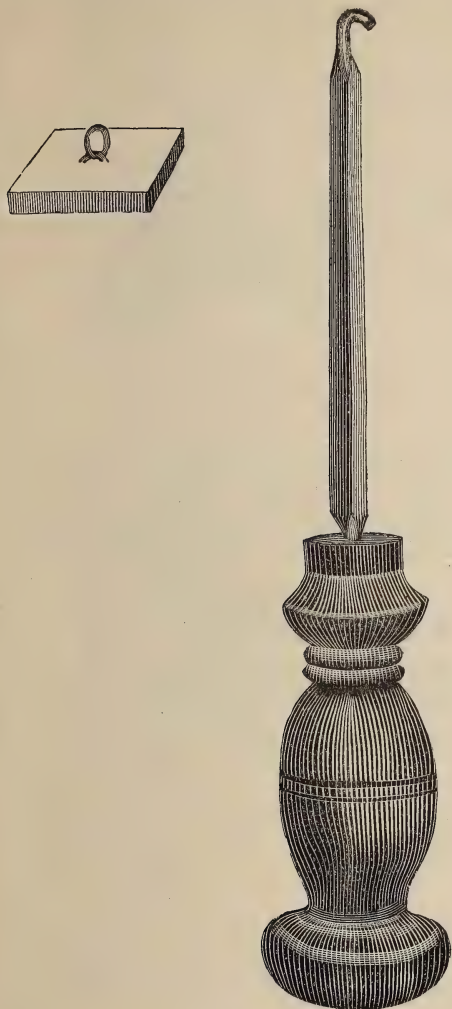


Fig. 7.

it hardens the gut and makes it less likely to draw.

The next piece of furniture we want is a plaster bench. This may be about four feet long by two wide, and made of

pine one inch thick. This bench is much improved if covered with sheet zinc which allows it to be kept clean and prevents moisture from soaking into it. A piece of wood about one

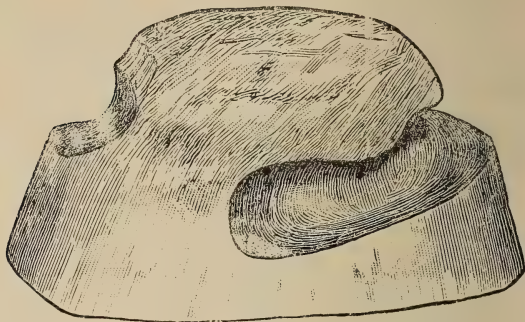


Fig. 8.

foot square and one inch thick should be fixed on this bench to trim plaster models upon, two or three basins, and a water jug, likewise a good strong knife or spatula to mix plaster

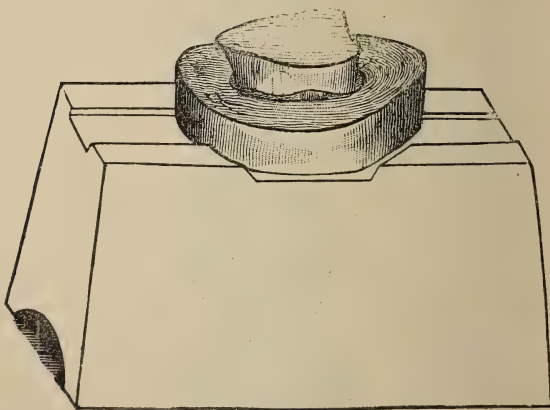


Fig. 9.

with, are required for this department. The india-rubber basins sold for mixing plaster in are very useful, there is no fear of breaking them.

We also require a large hammer, or stamper, and a block for swaging plates—Figs. 8 and 9 represent those used by the author. The iron block, grooved to fit the thigh, weighs about 20 lbs, while the stamper weighs about 7lbs. When using these the foot should rest upon the toes and not flat on the ground; this precaution prevents jarring the knee and ankle joints. If a hammer is used the block or anvil, may rest on a thick piece of wood, or bag of sand, to give it steadiness and to avoid noise.

(To be continued.)

EXAMINATION OF MOUTH AND TEETH.—Under this heading the Berlin daily papers have been giving notice that the Society of German dentists appeal for permission to make a periodical examination of school-children's mouths. It is pointed out that, according to the latest development of medicine and dentistry, certain diseases originate and are chiefly propagated in neglected mouths, containing many carious teeth and insufficiently cleansed. The members of the Society, and no doubt other dentists, will offer their services, and it is proposed to inform the parents of the children what treatment is deemed necessary. We believe some such system would be welcomed in our Board Schools, although possibly some people might object in the same way that a protest was recently made against an inspection of children's arms for vaccination marks. There might, however, be a "conscience clause" for those parents who preferred to to remain in ignorance as to the state of their children's teeth!

ABSCESS IN THE ANTRUM.*

By MR. F. A. MASKELL.

The Antrum of Highmore, or Maxillary Sinus, is a large cavity situated in the body of the superior maxillary bone and was known as early as the time of Galen, although inseparably connected now with the name of Highmore. Its apex is formed by the malar process and its base by the outer wall of the nose. The walls of the antrum are very thin, its roof being formed by the orbital plate and its floor by the alveolar process. It is larger in the male than in the female, and diminishes in size with old age. The teeth which most commonly come into relation with the floor of the antrum are the canines, bicuspid, and first and second molars. The antrum is partially closed by the "Ethmoid" "Inferior Turbinate" and "Palate" bones. In the articulated skull this cavity communicates with the middle meatus of the nose, by means of two small apertures left between the above mentioned bones. On the posterior walls of the antrum are the posterior dental canals, transmitting the posterior dental vessels and nerves to the teeth. In the normal condition this cavity is lined by a thin mucous membrane, continuous with the membrane of the nose, and this membrane is attached to a thick periosteum covering the bone. In the development of the superior maxillary bone, the maxillary sinus appears earlier than any of the other sinuses, its development commencing about the fourth month of foetal life.

ABSCESS IN THE ANTRUM.

Suppuration of the Antrum is the result of all acute or chronic inflammation of its lining membrane. The chief causes for the progression of inflammation to suppuration are :—

*Read at the Students' Society, Liverpool Dental Hospital.

1st. The presence of organisms.

2nd. Persistent irritation of the inflamed parts.

If persistent irritation be present then the white cells will accumulate in the softened tissues, and numerous new blood-vessels will be among the newly-formed cells. Both cells and vessels are bathed in the exuded serum and bound together by the coagulated fibrin ; then if the inflammation still progresses, the cells at the centre of the inflammation increase in number, the tissues in which they lie are finally destroyed and a space is formed containing leucocytes floating in a serous fluid. This fluid constitutes pus, and the cavity containing it is called an abscess cavity. The chief causes giving rise to suppuration are the following ;—

1. Abscesses attached to the fangs of teeth.
2. Extension of inflammation from the nasal cavities.
3. Extension of inflammation from the roots of teeth.
4. Presence of foreign bodies in the cavity.
5. Affections of the gums.
6. Traumatism.
7. Septic matter from gangrenous pulps.
8. Dental periostitis, with its sequels, necrosis and exostosis.

I believe that the general opinion is that abscess in the antrum is caused in the majority of cases by abscesses attached to the roots of teeth in close proximity to the antrum perforating and bursting into the cavity ; but Dr. M. H. Fletcher, supported by Zuckerkanal and Schippert, is of opinion that abscessed teeth have very little connection with the antrum, the percentage probably not being over seven to ten. His statement is upheld by taking into consideration the amount of cancellous tissues found about and above the roots of the molars in almost every case. On examination it will be seen that the cancellous bone about the roots of teeth, gives ample space for the products of inflammation.

These spaces being filled with soft tissues, easily take on inflammation and the products of inflammation may largely displace them. Furthermore, when there is inflammation in this cancellous tissue and about the apex of the root, the periodontal membrane is largely involved. This of itself gives way and the products of inflammation may easily push down the side of a root and also very easily perforate the alveolar process. The alveolar process on the buccal surface over the roots of the teeth being very thin, would be easily perforated, and in many cases the upper parts of the roots are simply covered with soft tissues and no bone; whereas the floor of the antrum is thicker and of a dense horny character, and is also held more firmly in position by the cancellous bone growing from its underside, consequently it would not be perforated as quickly as the alveolar process.

SYMPTOMS.

1. A dull deep-seated pain, shooting to the forehead, which also may be of a stabbing, neuralgic character.
2. Tenderness in region of Malar bone, with slight redness, swelling and heat of the soft parts.
3. Teeth appear lengthened.
4. Swelling in the sulcus, between the cheek and the teeth, from the canine backwards as far as the third molar.
5. Sharp constitutional disturbances.
6. Discharge of pus from nasal cavity.
7. Offensive odour perceptible to patient.
8. Nausea.

DIAGNOSIS.

A discharge from the nose accompanied by a deep-seated pain, together with offensive breath, perceptible to the patient only, whereas in Ozæna the offensive odour is perceptible to those around. The presence of diseased teeth in the molar and bicuspid region will also assist in the diagnosis, and teeth which

contain large fillings, pulpless, or with dead pulps, ought to be opened up and examined, and it ought to be borne in mind that the teeth which may have been the cause of the disease, will often have been extracted months or even years, before the case presents itself for examination. After extracting any teeth it is a good plan to pass a silver probe up the vacant alveoli, and with slight pressure it will pass into the antrum, when an odour from the probe, or the reverse, will at once settle whether the antral cavity is healthy or not. If the pus collected in the antrum does not find an exit, it distends the cavity, causing bulging out of the cheek and thrusting up the floor of the orbit. Under these circumstances the affection is readily recognised by the peculiar crackling which is perceived when the thinned bone is pressed upon. A point that must not be overlooked is that both antra may be affected, either consecutively or simultaneously, and we must also bear in mind that Empyema of the antrum if not recognised is liable to do great damage to the digestive organs, by the constant swallowing of purulent fluid during sleep. Under these circumstances the patient is always ailing, is unable to take any food, and may be reduced to a state of great prostration, even dangerous to life.

In doubtful cases of determining whether the antrum is in a healthy condition or not, a nasal speculum should be used, by means of which pus may be seen flowing into the middle meatus of the nose; another and a better means is by illumination of the antrum by electric light in the mouth (the patient being in a totally dark room); by this means the antrum if diseased will appear opaque, but if healthy translucent.

TREATMENT.

If the cause of the mischief be removed in time, the inflammation will subside under fomentation and the application of a leech to the gum, but if pus has formed then the

treatment of suppuration mainly consists in giving free exit to the pent-up matter. In cases where the teeth are badly decayed and are so far gone that it would not be worth while or advisable to restore them by means of fillings, then the the best plan is to extract all on that side of the mouth. The matter will then probably escape through one of the alveoli ; if it does not flow freely, the antrum should be perforated through the socket of the anterior buccal root of the first molar, on account of this root opening more often into the antrum than any other. When the matter refuses to flow after extracting the teeth, the Trochar should be used, and the opening made between the apices of the second bicuspid and first molar.

1st. Because this locality is the most accessible.

2nd. A perforation here does not interfere with the blood or nerve supply of either tooth.

3rd. By raising the lip well and slanting the drill upward and backward one is sure to strike the floor of the cavity, at its lowest point.

When the teeth are sound and it is determined to sacrifice one, the first molar is to be preferred for extraction, both on account of the depth of its socket and also because it is more liable to decay than any of the other teeth. If the patient has lost his or her teeth, then in that case the opening should be made in the middle line of the alveolar ridge. In cases where the teeth are sound and healthy, or even if they are slightly decayed, but can be restored by fillings, to the patient's advantage, then it is advisable to perform the operation by one of the following methods :—

1st. Through the canine fossa.

2nd. Through the alveolar process ; the advantage gained by this method is that it drains the cavity at the most dependent part.

3rd. Through the facial aspect of the upper jaw, above the

alveolar process, which is done by everting the cheek, incising the mucous membrane and thus exposing the bone above the position of the second molar tooth and then perforating with a drill, Trochar, or as suggested by Sir B. Brodie, with the scissors held closed in the hand and bored into the bone with a twisting movement.

A spear-headed drill in the dental engine will answer most purposes for perforating the antrum ; the opening can afterwards be enlarged by means of a trochar. In using this instrument great care should be exercised, the thumb ought to be supported against the jaw, so as to prevent the instrument suddenly entering and wounding the floor of the orbit. A trochar fitted with a moveable collar, which acts as a stop and prevents it penetrating further than desired will be found to be of great advantage. A very good instrument has been invented by Mr. Arthur Harris, L.D.S. It consists of two drills, one is bayonet-shaped, having three cutting edges, the other torpedo-shaped with five cutting edges. Its principal advantages are that it can be adapted to the engine ; the liability of the drill penetrating too deeply is lessened by the shape of the shaft, the diameter increasing towards the handle ; the opening made is perfectly round and smooth instead of being jagged, and the bone is more or less pulverised during rotation of drill, thence the chance of any portion entering the antrum is lessened. Sir William Fergusson in his "Practical Surgery" mentions that an ordinary modern carpenter's gimlet is a very useful instrument, as it can be screwed through a socket, alveolar process, or front of the antrum, with unerring facility, and it has the advantage of scooping out the hole, which will remain patent for a considerable time and so permit a free discharge, which is the main object of the operation.

After having made a free opening by means of a drill, trochar, or whatever instrument is being used, the cavity

should be washed out with some disinfectant lotions by means of a syringe, worked by an elastic-ball action, so as to be capable of throwing a continuous stream, or by employing an ordinary Eustachian catheter for the purpose, to which an india-rubber injecting bottle is adapted. When washing out the cavity, the patient's head should be inclined forward so that the lotion may flow freely through the nose, for if the matter is not all removed it may lead on to worse trouble. Several cases are on record, where the pus not having been removed, found a way out for itself, in one case the pus came out by the side of the teeth, and in another through the floor of the orbit; the result is often likely to lead to considerable necrosis. In three other cases it led on to temporary blindness in the first place, permanent amaurosis was the result in the second, and Meningitis followed in the third case.

The following formulæ for injection will be found useful :—

R.	Zinci Sulphate	...	grs. vi.
	Aquæ Rosæ	...	℥vi.
R.	Cupri Sulphat.	...	grs. iv.
	Aquæ Rosæ	...	℥vi.
R.	Tinct. Myrrhæ	...	℥i.
	Aquam ad.	...	℥vi.

The strength can be increased by degrees if found necessary.

Lotio acidi carbolicæ	...	1 in 40.
Lotio hydrarg. perchlor.	...	1 in 2000.
Hydronaphthol	...	1 in 200.
Condy's Fluid (diluted).		

After a time and a little instruction, the patient can learn to dispense with the syringe by forcing a mouthful of water through the antrum by the action of the Buccinator muscles. If the disease is of an acute form the cavity should be well drained and syringed out at first twice, and afterwards once a day; if of a chronic form, after having been well syringed

the cavity should be packed with antiseptic gauze dipped in carbolic acid (1 in 20) or some other antiseptic. This should be repeated until all discharge has ceased, the object being to destroy the diseased mucous membrane. The opening after having been well cleaned, should be kept closed, on account of the access of food &c., which may cause irritation. In most cases a plug of soft wax, wool, or gauze will be found to be sufficient. The best method however, both for the operator's success in the treatment of the disease, and also for the patient's comfort, is to take a model in the usual way, and then to make a plate with a tube reaching well into the antrum. The mouth of the tube should be fitted with a screw, so that it can be opened or closed at pleasure and will serve as a pipe for injection ; or it may have a wide funnel-shaped opening and be kept plugged with cotton wool &c. If through the operation, or before the operation, the patient has lost some of his or her natural teeth and wishes to have artificial ones to replace them, then this must be taken into consideration and the plate made accordingly ; on the other hand, where the patient is already wearing a plate, the tube should be fitted through an opening in that plate.

ANKYLOSIS OF THE JAW.--At the Manchester Medical Society, Mr. Walter Whitehead showed a patient aged eighteen years, upon whom he had successfully operated. The ankylosis was supposed to have been due to arthritis following fever at the age of five years. Attempts had been previously made to break down the adhesions under chloroform and the operation now performed consisted in the removal of a wedge-shaped piece of bone on each side. Mr. Whitehead thinks that passive movements are more easily persevered with in such cases than when the condyles are excised.

British Journal of Dental Science.

LONDON, JANUARY 1st, 1895.

PALL MALL CORRESPONDENCE.

Some of our readers will remember that we called attention to an article upon "Dentists and the Public" which appeared in the *Pall Mall Gazette* a month ago. It reflected adversely upon Advertising Dentists, and upon "American Dentistry," and we hinted at the time that a splendid opportunity was presented for practitioners who might class themselves under either of these sub-headings, to appeal for the right of reply and to be heard in defence. Curiously enough those of the first division are conspicuous by their absence, and we will not stop to enquire why. Amongst the many who have sent letters to continue discussion on the subject, the Bridge-worker, however, has been well represented. The original article declared that the term "American Dentistry" had even less significance than "French polish" or "Vienna bread," and quoted an American dentist to the effect that Bridge-work was a fad, destined to die out, and that nearly ninety per cent. of the cases were failures. These strictures were met by a "vigorous protest" by one correspondent, whilst another, who described the author's remarks as "ungrateful, ungentlemanly, and cowardly," carried the war into the enemy's camp. The failures were to be ascribed not to the system but to the incompetent dentist. This charge is practically repeated by a third Bridge-specialist when he says that it is the misapplication of the system which must be blamed for any failure if the work itself is properly performed. We are glad to notice that none of these gentlemen attach their names to their communications, and that, although claiming to be specialists, they thus avoid the charge of advertising them-

selves individually. For our part, we cannot help thinking that "victims" may not only be found amongst the patients of those who *pretend* to be specialists, but that there is even an element of danger in being too strong a specialist, even if a genuine one. Given an undoubtedly proper case for treatment, specialism may be as useful in Dentistry as in general medicine or Surgery ; but we know the view that is occasionally forced upon the general practitioner, and the criticism evoked by the complacent confidence manifested. Continual contemplation of a limited field of treatment is apt to dwarf the ability to recognise others as being possibly better ; and a disinclination to allow that the particular line of treatment so specialised is unable to meet the ordinary run of cases, may easily lead to a "misapplication" of the system. Do specialists in Bridge-work find that many of the patients seeking their advice and treatment are unsuitable ones for that particular form of artificial denture ? If so, do they send them away to the ordinary general practitioner, who, by the bye, may also claim to be able to do special work when occasion demands ? If patients are not thus directed aright, their advisers can scarcely be considered specialists in the ordinary acceptation of the term. We can, of course, quite understand a system by which the ordinary dentist may choose to send his own patient to an expert, not caring to undertake the construction of a bridge himself and yet conscientiously thinking the case a suitable one. Such instances are probably comparatively rare.

Among the other letters, one from a physician is perhaps the most refreshing. He recommends, as a safe plan, that a medical man should be consulted first as to what should be done to the teeth. "He will then give instructions to a properly qualified and reliable dentist." If they cannot do it themselves, medical men know what ought to be done ; "still more do they know what ought not to be done." Desirous as we are of encouraging doctors to examine their patients' dentition more frequently than is the case, we are of opinion that at present the majority will not accept the responsibility of issuing specific directions as to the mode of

treatment. A little trouble will certainly enable them to recommend a "properly qualified" dentist, but we still too often hear complaints of medical gentlemen administering anæsthetics for unregistered practitioners. We are not able, nor is it necessary, to refer to all the other *Pall Mall* letters, but we notice with pleasure that the watchful Dean of the Dental Hospital of London took the opportunity of laying the claims of his school before the public. £14,000 is still required for the new Building. Ten guineas constitutes a life governorship, and fourteen hundred of these would enable the hospital to be commenced forthwith. In reply to this suggestion a correspondent proposed, we hope only as a jest, that Life-Governors should be allowed to use the four yearly tickets for themselves; there would be plenty of app'licants and all the trouble of dentists' bills would be at an end! What a brilliant future the hard-working students would have before them after operating upon charitable subscribers and taking a diploma!

This is not the only correspondence on dental affairs now going on in the lay press. Wordy warfare is progressing in other parts of the kingdom, and, although matters are not always made so clear as one could wish, if the Public are induced *to think*, then the honourable dentist will be more content to await, with what patience he can, that gradually increasing recognition of his profession which "the signs of the times" promise.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.—We understand that the proposed Dinner of the members is fixed for February 2nd.

A FOREIGN BODY IN THE LARYNX.—It is generally held that when a foreign body passes down the trachea it is more likely to find its way into the right, rather than the left, bronchus. Not long ago Dr. Lediard published a most interesting case in the *Lancet*, in which half a sovereign was found *post mortem* at the bottom of the left bronchus. The

other points are also well worth repeating. A thief, in prison for pocket picking on March 17th, complained on April 9th that he had swallowed a metal button in his soup. A whistling sound was to be heard with expiration, only over the larynx. There was no dispnoea or marked cough, and at first the story was doubted. With a laryngoscope, however, a narrow metallic body, with milled edges, was seen lying beneath the vocal cords and nearly parallel with them. The patient then confessed it was the half-sovereign for stealing which he was in prison. The crico-thyroid membrane was opened but neither forceps nor finger, passed up into the pharynx, encountered the coin. On a later occasion the right bronchus was explored without result, and it was only after the patient had died from phthisis that the true situation of the foreign body was discovered. It is to be supposed that during chloroform inhalation, or when the larynx was opened, the coin slipped from its original position.

THE STRUCTURE OF PALATINE GLANDS.—At a meeting of the Pathological Society, Mr. S. G. Shattock showed a Tumour of the Palate which in structure resembled the growths of the parotid and sub-maxillary glands. This led Mr. Shattock to raise the question whether the palatine and labial glands in man were salivary. He made a number of experiments by finely mincing the gland tissue, triturating it with weak starch solution, and then placing the mixture in an incubator at the temperature of the body. The results were tested by the action of iodine solution, care having been taken that any acid reaction of the glands had been originally neutralised. The presence of ptyalin was demonstrated in only a few instances, two children and one adult. The question has an interest from a dental point of view, for if the glands, or some of them, situated upon the hard palate should be proved to possess some amount of amylolytic function, they can scarcely act to the best advantage when a complete upper denture covers the roof of the mouth.

RESECTION OF THE TRIGEMINUS.—An account has been published in *Il Policlinico*, by Dr. D'Antona, of two cases successfully operated upon for neuralgia. Both patients were women, and other treatment had been found useless. In the first case the third division of the Fifth Nerve was laid bare and followed up to the foramen ovale. The bone around it was removed with a trephine and the lower part of the Gasserian ganglion removed. The amount of connective tissue in it was afterwards found to be increased, and the ganglion cells reduced in number and otherwise affected. Two years later, the patient only complained of a little anæsthesia above and below the zygoma. In the second case, after the trephining there was such hæmorrhage that the wound was plugged and the completion of the operation postponed for forty-eight hours, when the third division of the nerve was removed. There was some suppuration afterwards, but fifteen months later the woman was still free from neuralgia.

HEREDITY IN PHTHISIS.—At the Royal Medical and Chirurgical Society recently, a discussion took place as to the influence of heredity in Phthisis. Dr. Edward Squire suggested that the frequency of the disease in the same family was at all events partly, due to conditions of life and environment. Whilst not denying heredity as a factor, the figures he quoted modified the received impression as to its preponderating influence. Enquiries were made in 1000 cases with special reference to the proportion in which apparent heredity was found, and the results tended to show that the influence of heredity could not be put higher than 9 per cent. of cases amongst the children of phthysical parents in excess of the cases occurring amongst the children of non-phthysical parents. It was argued that the hereditary influence was not a true heredity, but a tendency to suffer from disease, and in reply to a question, Dr. Squire said that the family house was certainly of more importance than the family tree—the surroundings were more dangerous than the pedigree.

Reports of Societies,

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, November 5, 1894. Mr. Frederick Canton, M.R.C.S., L.R.C.P., L.S.A., L.D.S., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following nominations having been approved by Council, were proposed to meeting:—John William Pare, M.D., C.M.Edin., L.D.S. Eng., 18, Portland Place, W. (resident); F. E. Davar, L.D.S.I., Church Gate Street, Fort Bombay, India (non-resident).

Obligation forms duly signed were read at the meeting, as having been received from the following:—Messrs. Charles S. Hull, Walter R. Wood, R. Woodcock.

The following signed the obligation book, and were formally admitted as members:—Messrs. P. Harrison, J. W. Shilcock, W. F. Mellersh, J. D. Whittles, H. B. Rowe.

The Curator announced the presentation of various preparations to the Museum during the recess.

Mr. Frank Merson (of South Molton) sent an upper incisor, removed from a young man aged 19, showing very considerable absorption of the root of the tooth, which was only about $\frac{1}{4}$ in. in length. Also a lower wisdom tooth removed from a lady aged 40. This tooth had caused a great deal of pain for some years, and eventually with some difficulty was removed. It appeared that the tooth was never erupted, but it was extracted without injury resulting to the second molar in front.

An analogous specimen to the one just mentioned was sent by Mr. Pidgeon, one of the students at the Hospital. It was the left upper central incisor of a girl aged 22. In clearing the pulp canal he came upon soft, sensitive, vascular material, evidently situated at the end of a very short canal. On extracting the tooth, the root was found to be only about $\frac{1}{4}$ in. in length.

Mr. Herbert Bowtell, a former student, sent the skull of a Maori, an aboriginal inhabitant of New Zealand. The teeth were very much worn by attrition, many were absent altogether, and had evidently long been lost. The teeth in front were very much worn through the loss of the back ones. The pulps of the remaining incisors and canines had

all been exposed during life and there had been alveolar abscesses connected with them. The Society was much indebted to the donor for this specimen.

The right half of the mandible of a cat, presented by a student of the Dental Hospital of London, showed as beautifully as any specimen he (Mr. Storer Bennett) had ever met with, the formation of a vaginal sheath enclosing dead bone. There was a very large sequestrum in the molar region, surrounded with extremely vascular porous bone—very thick indeed. It showed extremely well the method by which dead bone was enclosed by the new bone deposited around it. The examination of a preparation in the Museum, which he (Mr. Bennett) made some years ago, to show the dentition of the cat, when placed side by side with this specimen, would enable them to appreciate more readily the enormous amount of new bone formation which had taken place.

Mr Morton Smale had sent three mandibles, together with a long and interesting description. As they had only just been received, and there were several points of interest, he (Mr. Storer Bennett) proposed to reserve any comments till the next meeting.

Mr. Smale said :—

“I send three examples of the mandible of the hog ; the other part of the skull is not forthcoming. As far as I can ascertain they are probably from the common domesticated pig, and not, as probably will be surmised, examples of the hog whose upper tusks had been removed in order that the lower ones may be allowed to grow into a circle and be worn as a decoration or charm.

“The smallest one is evidently that of a young pig, and the tusk has grown in such a position that it resembles rather the curve taken by the lower tusk of the *Sus Babi-russa*.

“The next one in size shows the tusks taking an unusual curve ; they would probably ultimately have pierced the flesh and entered the bone.

“The large one is similar but more marked, and in addition shows, on the right side, a radicular odontome. On the left side the tusk has pierced the flesh and wedged itself between two molars and occasioned some considerable amount of inflammatory trouble, causing the fangs of the last molar to be partially absorbed. The mandible evidently belonged to an old hog, and consequently it cannot be said that the more anterior molar had been lost in consequence of the

position of the tusk, but it seems very probable. Mastication has been performed on the other side, as is shown by the wear on that side, and the tuberculate condition of the last molar on the left side.

"Without further history, which I cannot obtain, it must be surmised that the upper tusks in the animal (to which these mandibles belong) had been broken or removed."

An extremely interesting preparation has also been sent by Mr. Frank Merson, of South Molton, showing the enormous amount of damage that might be done to animals which had met with an accident, where the pulps of certain teeth were of persistent growth. It was the skull of a hare, and showed that the mandible had been fractured—evidently long prior to death—vertically, between the second and third molars. The result was, the antagonism of the teeth was imperfect, and the right lower incisor had grown to double the length of the upper one. He (Mr. Bennett) had brought from the Museum a preparation of a normal skull of a rabbit, which was practically the same as that of the hare, for purpose of comparison. The two upper incisors had both been deflected very much to the left side, the right incisor entering the cheek, and although the whole of the soft tissue had not been removed, the tooth had probably pierced the bone. The preparation was sent with all the skin and soft tissues attached, and a good deal of muscle was still left in position so that members might see the immense amount of damage done to the soft parts as well as to the bone. The molars in the mandible on the right side were very curiously abnormally placed in consequence of the attrition which was never after the accident anything like normal. The jaw could only be slid from the left side towards the right; the result was the first molar had been diverted backward, the second molar passed directly upwards in the normal position, and the third and fourth molars were directed forward, the upper molars biting upon the distal and lingual surfaces of the teeth. This produced a distinct interlacing of the teeth in a most remarkable manner. The normal height of the teeth would be from $\frac{1}{16}$ to $\frac{1}{8}$ of an inch, but these lower molars on the right side were erupted to the extent of $\frac{3}{8}$ of an inch. The rims were worn in such a way as to indicate evidently that the mastication was not an up-and-down one, nor an ordinary transverse one, but simply a sliding of the molars from the left side to the right, for the outer sides of the right upper molars had worn away, and the inner sides remained long. On looking at the under side of

the mandible it would be seen how very much stunted was the development of bone on the right side compared with the left, the two sides being symmetrical. He proposed to remove the remaining soft tissues and show the bone with the teeth fully displayed, but thought it would be interesting first of all to exhibit the skull with some of the soft part remaining, to show the immense amount of ulceration that had taken place. Not only had the left upper incisor ulcerated into the cheek but the tooth on the opposite side had also ulcerated into the cheek on its own side, so that ulceration had taken place on both sides of the mouth. The Society was deeply indebted to Mr. Merson for the three preparations he had presented.

The LIBRARIAN reported that the following books had been added to the Library ;—Tomes' "Dental Anatomy," fourth edition, Heath's "Injuries and Diseases of the Jaws," fourth edition : also that he had received in addition to the usual Journals and Periodicals, *Guys' Hospital Reports for 1893*, *Report of the Smithsonian Institution for 1892*, and *The Lancet*, in exchange. He mentioned that the Council had decided to open the Library during the coming year on Monday, Wednesday and Friday evenings in continuance of the present arrangements

The PRESIDENT announced with great regret the death of a very old member, Mr. Ibbetson, who was President in 1867

They proposed that evening to slightly depart from the usual course. There was no paper, and instead of filling up the evening with casual communications it was thought it might be agreeable to members to hold a kind of conversational evening, more especially as it was their first meeting after the holidays. Before closing the more formal proceedings he wished to thank very much those gentlemen who had kindly assisted in bringing forward microscopical specimens, and also those who had made such very handsome contributions to the museum.

Mr. H. G. READ showed a patient, a boy 4 years and 7 months old, exhibiting a very marked condition of hypertrophy, probably of both bone and fibrous tissue in the upper and lower jaws. The condition was especially pronounced in those regions of the mouth corresponding with the positions of teeth only partially erupted. There was a slight beading of the ribs and the boy's aspect generally indicated a rickety condition.

Mr. W. R. HUMBY showed a special hollow tray fitted with inlet and outlet tubes for irrigation by cold water for rapidly cooling composition in taking impressions of the mouth. The irrigation was carried out by means of tubing attached to a suspended tank filled with iced water. Mr. Humby claimed that the time occupied in taking an impression was reduced to one-fifth of that usually necessary, and that nausea in taking full impressions was considerably lessened.

Dr. JOSEPH WALKER showed a mouth mirror with an electric thermal attachment by means of which a moderate quantity of warmth is applied to the back of the mirror, obviating the condensation of moisture when held in the mouth. The current was supplied from a Pilkin's two-volt secondary battery.

Mr. GEO. BRUNTON showed a new quick-setting amalgam, called "Nurium," said to be composed of three-fifths of gold and silver. The amalgam was marked by a rapid setting, good colour and hardness.

Mr. C. ROBBINS showed a method of hardening the surface and defining the edges of amalgam fillings by wiping over with the ends of Wolrab gold cylinders.

Mr. C. S. TOMES exhibited various microscopic sections comprising:--

(1) Section of vaso-dentine from the hake, vascular canal showing the fissure-like canals running from the sides.

(2) Outer layer of dentine of cod, illustrating a connective tissue calcified with little change from its original aspect.

(3) Dentine of sargus near the base of the tooth.

(4) Cross sections of tooth and pulp of the ling, showing the connective tissue layer formerly wrongly described as an odontoblast layer.

(5) Connective tissue fibrils devoid of nuclei, which form in a definite layer the surface of the pulp of a hake.

(6) Section of dentine of hake, showing the tendency to split up in long lines corresponding to the connective tissue formative fibres.

(7) Lamination to be distinguished in vaso-dentine when fully formed and not decalcified, parallel to its surface, and therefore at right angles to the fibrils shown.

(8) Vascular canals of the dentine of the manatee, probably vestigial, resembling a number of interglobular spaces arranged in lines.

(9) Enamel of the sargus decalcified by chromic acid.

(10) Transverse section of outer layer of dentine of cod,

in which some rods are seen in cross section. The appearance has not been adequately explained.

(11) Developing tooth of the sargus showing the continuation of its pulp with the odontoblast layer within what was apparently a hollow bony pedestal.

Mr. MUMMERY showed: (1) A section of odontoblast layer of human tooth—iron and tannin impregnation method; also (2) Absorbent organ of temporary tooth showing giant cells; (3) Nerve bundles in the pulp—iron and tannin impregnation process.

Mr. HOPEWELL SMITH exhibited a section showing round cell sarcoma in connection with the peridental membrane of upper molars.

Mr. CAMPION showed specimens of pulp with well-marked presence of micro-organisms.

LIVERPOOL DENTAL STUDENTS' SOCIETY.

The second general meeting was held on Friday, Nov. 15th.

The President (Mr. Phillips) in the chair.

The Secretary read the minutes of the last meeting, which were passed. Messrs. Maskell, Lloyd, McBrien, Field, James, Jones and Alden, were admitted members of the Society.

Mr. Coysh showed a sequestrum, extending from the first left lower bicuspid to the right central, inclusive. The patient, a girl about 16 years of age, came to the hospital with a swelled face and a suppurating sinus under the chin. On examining the mouth the first left lower bicuspid was found to be impacted and the tissues round it the seat of profuse suppuration. The section of alveolus containing the 1st. bicuspid, canine, lateral and central was loose, and there were several discharging sinuses in the mucous membrane covering it. The bicuspid was dead, but the other teeth contained in the sequestrum were alive. For this reason, and because the inner plate of the alveolus appeared less affected than the outer, he at first entertained hopes of saving all but the bicuspid. He ligatured the canine lateral and central together and syringed the mouth and the sinuses out periodically. In about two months the sequestrum shewn came away. He

considered the necrosis in this case due to inflammation and abscess set up by the impaction of the bicuspid. (In answer to questions), there was no history of traumatism, exanthematous fever, of syphilis, but the patient was of strumous appearance.

Messrs. PHILLIPS and BATES did not think simple impaction of a tooth was sufficient to cause so severe an affection as necrosis.

Mr. PARSONS cited a case under his care in which the patient, a lady of 45, was afflicted with severe nervous affection of the facial muscles on one side, notably the orbicularis oris. Her medical adviser, having regard to her age, considered it due to uterine changes. She had several dead teeth on that side in the lower jaw, and he wished to know if root-filling would be advisable in such a case.

Mr. PHILLIPS said that he would extract all the dead teeth, which opinion was confirmed by several members.

Mr. BATES said the effect of tooth extraction in nervous complaints was often surprising. A young lady was brought to him recently who suffered from frequent epileptic fits. He extracted several decayed teeth, since which the fits had become of less frequent occurrence.

DISCUSSION ON MR. MASKELL'S PAPER.

Mr. J. NIXON had lately seen a case of *hydrops antri* which closely simulated empyæma of the antrum in all symptoms except the nasal discharge. He recommended as large an opening as convenient to be made in treating antral abscess, with a view to convenience in future curetting, etc., if necessary. An American author had lately said that the discharge from all *empyemæ antri* contained the tubercle bacillus, which was contradictory to all previous observations. He (Mr. Nixon) disapproved of patients being taught to irrigate the antrum from the mouth, on account of the septic matter liable to be carried in.

Mr. BATES said he had been fortunate enough to treat a great many cases of antral disease. He had found antral abscesses in connection with all kinds of teeth. In one case he had extracted an upper wisdom tooth and been able to pass his finger through the socket into the antrum. In another case the canine tooth was the cause of the trouble. Of all cases in which it was necessary to make an opening into the

antrum, edentulous cases were the most difficult, and after them, cases where an opening into the canine fossa was required. In opening an antrum he always made a fine passage for exploratory purposes before using a large drill. The discharge from the nose is often absent from two causes, 1. The opening into the nasal fossa being blocked; 2, from the abscess forming under the lining membrane of the floor of the antrum, which bulged with the rise of the swelling and enveloped it.

Mr. CAPON shewed an upper 6-year molar having a large abscess sac between its palatal and buccal roots, which had extended into the antrum. The patient had made a good recovery since the extraction.

Mr. OSBORN said that in his opinion, the only place to tap an antral abscess was through the alveolus. In opening through the canine fossa, it was very common to puncture above the floor of the antrum, which made drainage imperfect. In his experience he had found chloride of zinc by far the best antiseptic lotion for irrigation of the antrum.

Mr. COYSE had seen electric light tried in the diagnosis of empyæma of the antrum, on one occasion with success, but on another both antra appeared alike. He had seen a case where an abscess connected with an upper lateral tooth had burrowed back and opened into the antrum.

Dental Hospital Reports.

WORK DONE at the Victoria Dental Hospital of Manchester
during the month of November, 1894.

Number of Patients attended	959
Number of Extractions	663
Number of Extractions under Anæsthetics	207
Gold Stoppings	32
Other Stoppings	72
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	282
Crowns	4
Irregularities	46
Total	1306

JAMES A. LEES, *House Dental Surgeon.*

British Journal of Dental Science.

No. 648. LONDON, JAN. 15, 1895. Vol. XXXVIII.

GENERAL PATHOLOGY AND SURGERY FOR DENTISTS.

By EDMUND W. ROUGHTON, M.D., B.S., (Lond.),
F.R.C.S. (Eng.)

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(*Concluded from page 13.*)

TUMOURS OF BONE.

Any of the connective-tissue tumours may occur as primary growths in bone. Epithelial tumours of bone are rare, and can only occur as secondary deposits.

OSTEOMATA.

Osteomata are tumours composed of bone ; they may be circumscribed or diffuse ; the circumscribed osteomata (exostoses) may be composed of compact or cancellous bone.

Compact Exostoses grow from the bones of the skull and face. They are composed of compact bone, and are sometimes as hard and dense as ivory ; they have no definite Haversian systems ; they are usually sessile or broadly pedunculated. They grow very slowly and are painless unless they happen to press upon a nerve. No attempt should be made to remove them unless they cause pain or deformity. They are best

attacked by means of drills and saws worked by the surgical engine ; the ordinary saw is powerless with the hardest exostoses.

Cancellous Exostoses grow from the long bones near the epiphysial cartilages, or at the insertion of tendons ; they are also frequently found on the ungual phalanx of the great toe. They are composed of cancellous tissue, limited by a layer of compact bone, which is either encrusted by cartilage or covered by periosteum. They grow either by ossification of the encrusting cartilage or by deposit of new bone from the periosteal covering. Their growth is slow and tends to cease when the ossification of the bone from which they spring is completed. They occur in young people and are usually single ; sometimes, however, they are multiple, and may affect nearly every bone in the body. A cancellous exostosis should be left alone, unless it is large and unsightly, or inconvenient, or is growing quickly, or continues growing after complete ossification of the bone from which it springs. Removal may be accomplished by the saw, gouge or chisel. Multiple exostoses are not amenable to treatment.

Diffuse Osteomata affect the bones of the face. They consist of finely cancellated bone ; they have no definite limits, but gradually encroach upon the cavities of the orbit, nose, antrum, &c., until they are nearly filled up. The pathology of this condition is not understood, and no treatment is of any avail.

ENCHONDROMATA.

Cartilaginous tumours of bone are most commonly found growing from the interior of the metacarpal bones and phalanges of the fingers, and expanding the compact tissue. They are usually multiple and often congenital ; they grow slowly and sometimes calcify, but only rarely become ossified. The smaller ones may be enucleated from the interior of the

affected bones ; the larger ones require amputation of the fingers or hand.

FIBROMATA.

Fibrous tumours of bone are almost limited to the jaws (*fibrous epulis*) and base of the skull (*naso-pharyngeal polypus*.)

SARCOMATA.

Sarcomata of bone are divided into periosteal and endosteal.

Periosteal Sarcomata may be composed of round, spindle, or mixed cells, and may grow from the deeper (*subperiosteal*) or superficial layers of the periosteum. They are most often found in the vicinity of large joints affecting the ends of the long bones. They form large rapidly-growing tumours which often invade the interior of the bone as well as the structures towards the surface of the limb. They are very malignant and are prone to disseminate throughout the body, but they do not often affect the lymphatic glands. They may calcify or ossify ; fig. 24 represents a periosteal sarcoma of the upper end of the fibula which has become extensively ossified. The diagnosis is very difficult in some cases ; it is often impossible to distinguish between a periosteal sarcoma and a mass of inflammatory exudation in connection with osteitis and periostitis until an incision has been made into the swelling. Periosteal sarcomata sometimes are so vascular that they pulsate ; they may then closely resemble an aneurysm. The treatment consists in free and early removal ; this usually necessitates amputation.

Endosteal Sarcomata are most often found in the upper end of the tibia, the lower end of the femur and the lower jaw. A few endosteal sarcomata are of the small round-celled variety ; they are of rapid growth, involve the whole length of the interior of the bone without definite limitation

or capsule, and are extremely malignant ; but by far the commonest variety of endosteal sarcoma is the myeloid. This is of slower growth and less malignant than the periosteal



Fig. 24.

PERIOSTEAL SARCOMA.

A large ossifying Periosteal Sarcoma of the upper end of the fibula. The soft parts have been removed by maceration. The shafts of the tibia and fibula are roughened and joined together by osteoplastic periostitis. (From a specimen in the Museum of St. Mary's Hospital.)

sarcoma. It is usually limited to the articular extremity of the bone and distinctly circumscribed ; it expands the bone equally in all directions (see Fig 25). The expansion may

be so great as to reduce the layer of compact tissue to a mere shell, which can readily be indented by the finger, producing a crackling sensation usually called "egg-shell crackling," but much more closely resembling the sensation obtained by



Fig. 25.

MYELOID SARCOMA OF TIBIA.

The upper extremity of the tibia is expanded by a growth containing numerous cysts. (Museum of St. Mary's Hospital.)

buckling-in a hard felt hat. It is rare for the tumour to invade the neighbouring joint, in this way differing markedly from abscess of the articular ends ; it appears that cartilage does not offer a favourable soil for the growth of tumours, and is not readily absorbed under simple pressure. The thinned bone may fracture "spontaneously." On section the tumour usually presents a dark red tint and contains several cystic spaces occupied by a blood-stained fluid. The symptoms are usually obscure ; a diagnosis is not often possible until the bone has been sufficiently expanded to crackle under pressure, or sufficiently weakened to lead to spontaneous fracture.

Sometimes it is possible to enucleate a small myeloid sarcoma, but in the majority of cases it is necessary to remove the diseased bone by excision or amputation.

RICKETS

Rickets is a general state of malnutrition and consequent arrest of development in which the bones become soft and bent. It occurs most commonly in children from eighteen months to three years old. It may be due to debility of the mother during pregnancy and lactation, improper feeding, and bad hygienic surroundings. The bones are not the only parts affected; the liver, spleen, and lymphatic glands become enlarged and contain an excess of fibrous tissue, and the muscles become soft, flabby and wasted.

In studying the changes which occur in rickety bones it is necessary to bear in mind the mode of growth of a healthy bone. A bone increases in length by formation of bone at the epiphysial cartilages, and in thickness by deposition of bone from the deeper layers of the periosteum; as the new bone is deposited at the periphery from the periosteum, so the older central portion becomes absorbed and the due proportion in size between the medullary cavity and the thickness of the shaft maintained. In rickets the line of ossification between the epiphysis and diaphysis is greatly increased in thickness and very irregular, small islands of cartilage frequently escaping ossification; the neighbouring medullary substance is abnormally vascular, and the new bone formed is deficient in earthy salts. The osteogenetic layer of the periosteum is thickened and produces soft spongy bone deficient in earthy material, and unable to bear the weight it has to carry.

Symptoms. The child is restless and fretful, especially at night, when he throws off the bedclothes. There may be

tenderness about the limbs and a great tendency to sweat, especially about the head ; the abdomen is large and tumid ; the dentition is delayed and the teeth ill-formed and prone to decay ; sometimes large quantities of phosphates are excreted



Fig. 26.
RICKETS.

The tibia and fibula of an adult who had suffered from rickets in childhood. Both bones are bent. The fibula is much thickened.
(Museum of St. Mary's Hospital.)

in the urine ; bronchitis, diarrhœa, convulsions, etc., are more common than in healthy children.

The ends of the long bones become thickened, so that the ribs are "beaded" at their junctions with the costal cartilages,

and the wrists and ankles enlarged. Sooner or later the long bones bend, leading to knock-knee, bow-legs, etc. The ribs yield to the atmospheric pressure, the chest becomes narrowed from side to side, and the sternum unduly prominent (pigeon-breast). The spine becomes bent, and the pelvis flattened. The head is square and the frontal and parietal eminences unduly prominent; the fontanelles are late in closing; in places, especially at the back of the skull, ossification may be so imperfect as to leave thin places which can be indented by the finger (*craniotabes*). Rickety children frequently succumb to some of the various intercurrent affections to which they are liable; but when recovery takes place the bones become consolidated in their deformed shapes and are often harder and denser than natural, their concavities being strengthened by a buttress-like ridge of bone.

Treatment. Proper food and healthy hygienic surroundings are the most important remedies. The general nutrition should be improved by the administration of cod-liver oil, phosphate of iron, etc. Deformity must be prevented by suitable splints or remedied by operative proceedings as occasion may demand.

MOLLITIES OSSIUM.

This disease occurs in adults, especially in females during the child-bearing period. Its causation is unknown. The bones become softened through re-absorption of their earthy salts. The medullary tissue becomes soft, dark red and gelatinous, resembling the spleen-pulp, and replaces all the bony substance except a thin layer of compact tissue immediately beneath the periosteum. The urine contains an excess of phosphates. It will be observed that in this disease healthy bone becomes decalcified, whereas in rickets any healthy bone that may have been formed at the onset of the disease is

simply removed in the ordinary process of growth and replaced by imperfectly calcified osseous tissue. The deformity in mollities ossium is usually extreme and often accompanied by fracture of the softened bones. Recovery is extremely rare ; death usually takes place from exhaustion or from interference with respiration. No treatment is of any avail.

DENTAL MECHANICS.

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Continued from page 27.

Having given a description of the fitting of the workroom it would not be complete if a list of the tools necessary to do our work with were omitted. The dentist's ordinary tools and appliances will come first, and then those which, although not absolutely essential when a depôt is handy, would be of the greatest service, both in saving of time and expense, if the dentist was situated where he could not obtain all he wanted.

The ordinary working tools in a Dental Laboratory are :—

Shears, straight and curved.

Nippers, large and small.

Pliers, plate cutters.

Straight, half round, and wire pliers.

Punching pliers, large flat pliers for drawing wire.

Sculptors, half round, large and small ; flat, large and small ; and a triangular and knife-edged graver.

Drill-stock, and drills.

Chamfering tool for metal.

Files ; rough, medium, and smooth, for gold or plate work.

Rasps ; rough and medium, for vulcanite work.

Pin-vice, for holding wire.

Saw-frame, and piercing saws.

Metal files, coarse and smooth for steel and brass.

Hammers, rivetting, chasing and large.

Broaches. Blow-pipe.

Horn mallet. Tweezers.

Grindstone, to work by the foot.

Oilstone, Arkansas, or Turkey.

A steel pointer for marking holes.

A couple of scrapers for vulcanite work.

Pair of compasses. Calipers.

Double-ended wax modeller.

Small screw-plate and taps.

Slate for borax. Water bottle and brush.

Water-of-Ayr Stone.

Plate elevator. Plate punches.

Brass modeller for patterns.

Common penknife. Bite-frames.

Draw-plate, and guage-plate.

Block and stamper for swaging.

Vulcanizer and flasks.

Clamps for vulcanite work to prevent raising of the bite.

Bunsen burners for waxing-up cases, and for boiling water. Casting rings, sandbox and sand.

A steam swager.

Petroleum Blast, and furnace for melting the precious metals.

Petroleum Blast, and furnace for continuous gum.

The tooth-clipper (Fig. 7), may be made in the following manner. Take an old worn-out triangular file about 7 inches

long, then soften one inch of the end, reduce half that length still smaller so as to leave a shoulder. With the grindstone we now grind out all the file marks, but still keeping its triangular shape. A hole is then drilled in a piece of thick brass so that it will slip on to the end of the clipper and rest against the shoulder. The brass is now filed into circular shape, so as to form a nut. Or an inch of the point of the file may be reduced to about one-eighth of an inch, then made red-hot and bent like fig. 7. A screw about an inch long, the head of which forms a ring, (to be obtained from any ironmonger's), is slipped on to the file, after removing the nut. The latter is then replaced, and rivetted on. A handle is adjusted to the clipper and the edges given a final touch on the oilstone. It is now ready to be screwed into a convenient part of the lathe bench. A piece of sheet lead about three inches long, $2\frac{1}{2}$ wide, and one-eighth thick, is now tacked in a line with the clipper, this is to rest the tooth on to prevent it from slipping.

In order to chip teeth with safety, it is advisable to run a nick or groove in the base of the tooth, with a corundum or carborundum wheel, this limits the amount to be removed.

The model of the stamper (Fig. 8) is made in the following manner.

Mix up a pint basin full of plaster of Paris, and build it up on the plaster bench somewhat to the required form. Now, mix another basin of plaster, and having dipped the model into cold water, place it on the bench again and cover it with a layer of soft plaster about half an inch thick.

After moulding it roughly to the required shape, and before it hardens, it should be covered with a layer of tissue paper, and grasped pretty firmly with the right hand, the tissue paper preventing the plaster from sticking to the fingers.

Indentations in the soft plaster will thus be formed by the fingers and thumb corresponding to those shewn in the figure.

A model such as this in cast iron can be obtained from any iron foundry. The object of the indentations is to ensure a firm grip of the stamper while stamping up a plate, so that a good steady blow can be given.

The size of the stamper is at the base $5\frac{1}{2}$ by $4\frac{1}{2}$, and in height $2\frac{1}{2}$ inches.

The model of the block for stamping on, is made of plaster in a similar manner to the stamper. It has a circular space left on its upper surface for the lead counter to fit into, and is grooved, as shewn in Fig. 9. The dimensions are:—height $3\frac{1}{2}$, base $7\frac{3}{4}$ long, by $4\frac{1}{2}$ wide, the top of the block is $7\frac{1}{4}$ inches long, by $3\frac{1}{2}$ wide, the depth of the groove to fit on to the leg is $\frac{3}{4}$ of an inch in the centre.

When using the block the workman should not have his foot flat on the ground, but raise the heel and let the weight rest on the toes.

DESCRIPTION OF THE TOOLS, WITH AN EXPLANATION OF THEIR SEVERAL USES.

Shears, straight, and curved, also plate-cutters. These three tools may be grouped together, as they are all used for cutting and trimming up the metal plate after it has been marked out. Curved shears are necessary when one has to follow the curves and indentations of the pattern. The plate-cutters are for cutting out the plate where recesses are to be made for the natural teeth to fit into. By using the shears for this latter purpose, one is apt to make a nick in the plate, which would have either to be filed out or soldered up. This can be avoided by using the plate-cutters, which make a clean, well-defined, half-round cut, at the deepest part of the concavity. It is then only necessary to make two lateral cuts with either the straight or curved shears to meet the half round cut already made, and the piece of metal is removed and the concavity formed.

Small nippers, or cutting pliers, are for trimming up a

plate when it is in course of manufacture, or if it is necessary to reduce its size when completed. The object in using them is to avoid the risk of bending or distorting the plate, as would certainly be the case if the shears were used.

When using the nippers, only about one-sixteenth of an inch of the plate is cut at a time, and the student should practice cutting brass, or German silver plate, until he has obtained the necessary dexterity, and can cut the plate without bending it.

No wire should be cut with the nippers above the size used for tube teeth, for thicker wire, larger and more powerful ones are necessary, or in the absence of such, a nick should be made in the wire with a file.

The same rule holds good for shears, they are quite strong enough for ordinary dental plate, but not for that which requires a heavier strain to cut it. When cutting a plate with the nippers it should be held loosely, and quite close to the part that requires removing.

Pliers, flat-pointed, half-round, wire, and hollow and round.

Flat-pointed pliers are intended for bending or holding small pieces of plate, such as the metal backs of teeth, while being filed.

Half-round pliers are the safest for bending up gold, for clasps; one jaw being convex, the gold can be bent without being indented by the sharp edge of the pliers, as would be the case if the flat pliers were used.

Wire pliers have a roughened, parallel groove cut in their blades into which the wire is placed, and so held firmly while it is being filed. These pliers are also used for roughening the pins for tube teeth, before they are cemented on. This latter operation must be done with a light hand, or the pin may be twisted off.

Pliers, called "hollow and round" are used by block-makers, but come in very well for dental purposes. One of

the blades is perfectly round while a deep concavity is formed in the other. A number of uses can be found for this tool, especially in the making of collars and crowns.

Sculptors are flat or half-round tools used for carving or trimming up the edges of clasps where they join the plate, or the inside of concavities, that cannot be got at with a file.

They are used in vulcanite work for trimming the rubber from around the necks of the teeth.

For these purposes we require two half-round sculptors, large and small, and two flat, large and small, and also a triangular and knife-edged graver.

These should always be kept with a good edge on, if one wishes to avoid cutting one's fingers. It is the blunt instrument that causes an accident; the reason is, that more force is used than is necessary, and the instrument or tool slips off the object instead of cutting into it.

Besides this, a cleaner and sharper cut can be made, and a better finish obtained than by using a blunt tool.

To learn how to use sculptors properly the student should fit a few bone blocks, and carve some teeth in ivory or bone. This will not only teach him to hold the tool properly so as to keep it under perfect control, but will at the same time educate his hand.

The drill-bow is usually made of either whalebone or cane, preferably the former, it being more pliable and stronger. It should be about fifteen inches long, and the thickness of the point of one's little finger at the butt, or thick end, and should be tapered to half the thickness at the thin end. Two small holes are drilled in the butt about one and a half inches apart, and another hole is drilled in the small end, this end is also notched.

A hank of fine gut (cat-gut) having been obtained from the depôt, or tool-shop, and the end having been passed through one of the holes made in the butt, (it should be the

hole furthest from the extremity), a knot is made in it. The knot is then drawn tight up against the bow, and the gut is then carefully bound round it, down to, but not beyond, the first hole. When a length of gut sufficient to last a considerable time has been wound on, the end of the gut is passed through the hole nearest the butt, and from there it is carried to the thin extremity of the bow. It is then passed through the hole in the end and made secure by one or two knots, the notch previously mentioned preventing any slipping. When the piece of gut is worn out, another supply is unwound and the end made secure again.

The drill-stock, is a steel mandril about three and a half inches long, with a hole either round or square, about half an inch long, made in the extremity, and running parallel with the shaft. Three quarters of an inch from the other end is a pulley around which the gut of the drill-bow works, in order to rotate it; this end is tapered down to a point so as to fit into a small hole in the side of the bench-pin.

The drills to fit the stock are made of soft steel wire, filed to fit the hole in the drill-stock. They should be about one inch and a quarter long; that will leave three quarters of an inch extending from the end of the drill-stock. Of this piece a third should be left round, and of the proper size of wire used; the other half inch should be first made four-sided, and then reduced to half the thickness. The under surface of the drill should now be slightly smaller than the size of the hole that is intended to be made, the upper surface of the drill should be bevelled away a third of its width, and the extremity, or cutting edge, bevelled from each side until a point is formed.

The drill should now be hardened and tempered, and the bevelled edges of the point sharpened on the oilstone.

A drill shaped like this, clears itself as it goes into the substance, and can be practically used up to the end.

Two or three of these drills should be kept in stock so as to prevent delay in the work should an accident occur.

A chamfering tool for countersinking holes in metal work can be easily made out of an old rat-tail file by breaking the thin point off, and bevelling the end four-sided, until a point is produced. This shaping of the end can be effected on the grindstone, and therefore need not interfere with the temper of the file. This tool should be fixed in a handle, and kept sharp. A similar tool to this is used for countersinking the hole in the base of a tube tooth, to allow for an excess of solder around the pin, where it enters the plate.

Files and rasps. Stub's files are considered amongst the best. They are usually sold without handles, but can be had with flattened end to form a handle if preferred. In the author's opinion the wooden handle is the best; it is more convenient to grasp, and enables one to use the file in a neater and more workmanlike manner. The length of a file is taken from end to end of file cut, and different varieties are known by the names of rough, bastard, second-cut, and smooth. They are called half-round, round or rat-tail, mouse-tail, a smaller edition of the round, square, or triangular. These are metal files, but the first-named can be used for Vulcanite work as well. For roughing down a Vulcanite case rasps are used.

Hand-vice. This is a most useful tool, and comes in for a multitude of purposes; amongst others, holding steel wire for making drills, taps for use with the screw plate, and any small instrument or piece of plate that requires to be held firmly.

A Pin-vice is used for holding wire, up to about No. 4 guage. The jaws are grooved and a hole runs through the whole length of the handle, so that a length of wire can be taken and passed through it, leaving protruding from the jaws only the piece required. By taking hold of the handle

by the thumb and finger the wire can be rotated while being filed, thus enabling one to file it true.

Saw-frame (adjustable) for taking piercing, and fret-saws. These are used for dividing clasps if soldered to the plate, for cutting out a circular piece from the centre of a plate to insert a suction-chamber, and for many other purposes. The saws should be so adjusted that they are directed towards the handle, and the saw cuts by pulling it. The saws are not so liable to break if used in this manner.

A metal saw is also of great service for sawing off the teeth of zinc models, and for coarse metal work generally. An old saw is a convenient thing to use when one has to reduce a hard plaster model in thickness.

For other than the precious metals flat and triangular files are used.

Of Hammers, three sizes are required for rivetting, and also for chasing, besides a large-sized hammer for rough work. The rivetting hammer should have a pointed end and a thin, flat, end. The chasing hammer is for use with the punches for chasing around the necks of teeth on the metal model, and the large hammer is for knocking zinc models out from the counter, and for general heavy work.

Broaches are tools about three inches long, about the size of an ordinary knitting needle, and are usually tapered to a point and are five-sided. They are used for opening the hole made by the drill to the proper size.

The Blow-pipe. This is a taper brass tube about ten or twelve inches long, and is obtained either from the dépôt or tool shop. It is best to cover the mouth end with a silver ferrule or a piece of india-rubber tubing, to protect the lips from the action of the brass.

The Bellows blow-pipe (Fletcher's) is a most useful tool, especially for those with weak chests, or who cannot use the ordinary tube blow-pipe. The secret of soldering is to get

the case thoroughly heated up over the Bunsen burner before beginning to use the blow-pipe.

The Horn Mallet is used for roughly getting the plate into position. One end is usually too large when obtained from the depôt, and should be filed or sawn to a thin wedge shape.

Tweezers are used for placing small pieces of solder in position on the case and for lifting plates etc., from the soldering block. Tweezers such as those used for dissecting purposes are light and at the same time strong, they are obtained from the depôt or tool-shop.

Arkansas stone is very good for putting an edge on instruments and tools after they are ground. It should always be kept clean, and lubricated with grease that does not thicken or cand.

A steel pointer, for marking holes, can be made from a broken excavator, or from a piece of thick steel wire, filed to a nice fine point, then hardened and tempered ;—it is used to deepen the marks, before using the drill to make the hole for the pin for a tube tooth, and to mark the places in metal when backing teeth, etc.

Steel scrapers for vulcanite work can be made from old metal files by grinding them into the required shape on the grindstone. The files being of an excellent temper it will repay the outlay of time necessary to grind them into shape.

Compasses or dividers come in useful where one wishes to ascertain the height of an old set that the patient may be wearing.

This is accomplished after one has taken fresh impressions of a patient's mouth, the models are made and the old cases are then placed on them. A mark is then made on the upper and another mark on the lower model, and the width taken by the compasses, this width is then marked on the back of the model and can be used as a reference. The same width is

also marked at the sides of the models as well as the front. This gives us a good guide for remaking the set.

The compasses are also useful in ascertaining the width of the jaws, and the amount of movement that may have taken place when regulating teeth.

Calipers are to ascertain the thickness of a case, but are not much used now owing to the introduction of more perfect means of producing a polished plate of an even thickness.

Double-ended wax modeller. This is a very necessary tool, it should be about six inches long and the ends flattened, one end is rounded and the other brought up to a point. It is used for moulding and waxing-up a case. It need not be tempered as it has to be made hot while using.

Small screw-plate and taps. These are used for making screws for split expansion plates, and also for making screw tubes for pivots, etc.

When using the screw plate, the piece of wire that has to be tapped is annealed, then filed four-sided, and slightly tapered at the point. This is to get a better start for the thread of the screw. The wire should not be screwed through the plate direct, but cautiously, that is screwing it backwards and forwards until the desired amount of thread is obtained. The female thread is produced in the same way, using the tap lubricated with a little oil. The tube to be tapped can be held in the vice if a piece of wire is fitted tightly into one end of it. This prevents the tube from being bent.

For soldering purposes, a slate for borax is required. This may be mounted in lead or plaster of Paris, to keep it steady on the bench. Borax is used as a flux to cause the solder to flow easier ; it acts by cleaning the surface of the metal it comes into contact with, and so causes the solder to flow over it.

(To be continued.)

A FEW NOTES ON SOME OF THE DISEASES OF
THE MOUTH.*

By Mr. E. A. WHEELER.

Mr. President and Gentlemen,—The subject of “Diseases of the Mouth,” is, as you are aware, rather an extensive one, and would require very many papers to deal with it effectually. Therefore, I think it will be more correct that the title of this paper should be, “A few notes on some of the Diseases of the the Mouth.”

Let me commence with Gingivitis, of which the two chief forms are Acute and Chronic.

Acute Gingivitis, is in most cases, a purely local disease, generally arising from the irritation of dentition, or as a consequence of periostitis. The inflammation sometimes extends to the submaxillary glands and muscles of the face, accompanied by swelling of the parts.

Diagnosis.—The margins of the gums become acutely inflamed and painful to the least touch. The free margin of the gum around the teeth is of a pale colour, while the inflection of gum from this point to the cheek, is of a much deeper colour, showing the capillaries congested, and pus is often seen oozing up from around the teeth. The patient experiences a sensation of heat and pain; there is an impairment of taste, the breath is offensive and the tongue furred; there is also a loss of appetite and slight derangement of the bowels.

Treatment.—An aperient should be administered and some sort of a tonic given, such as iron and quinine; an antiseptic and astringent mouth-wash should also be used.

Chronic Gingivitis, more often occurs in those patients who pay no attention (or scarcely any) to cleaning their

* Read before the Student's Society, National Dental Hospital.

teeth. This uncleanly habit causes an accumulation of extraneous matters between the teeth and along the edges of the gum.

These matters decompose, producing irritation, and so cause increased vascular action, followed by congestion, stagnation, the breaking down of tissue and the secretion of pus.

I have seen cases of chronic gingivitis which were caused by a gutta percha filling, which the patients have endeavoured to put in themselves; but not content with filling the cavity they have plastered the gutta percha on the surface of the gum as well, thus setting up irritation, and so producing inflammation and in some cases suppuration.

Other local causes of chronic gingivitis are: the irritation of artificial dentures, the secretions of the mouth becoming acrid, or the presence of tartar round the necks of the teeth. Then there are predisposing causes, such as dyspepsia, syphilis, excessive use of mercury, inflammatory fevers, also intemperance.

Diagnosis.—The free edge of the gum is red, swollen, congested, painful, and bleeds at the least touch. In some cases, (i.e. in patients of strumous diathesis) there is hypertrophy of the free edge of the gums.

Treatment.—This of course depends on the cause. In the first place, all source of irritation must be removed, such as tartar, loose roots, etc. The mouth must be kept thoroughly clean. If the gums are at all congested, they should be scarified and the bleeding encouraged. If caused by excessive use of mercury, the drug should be discontinued. In cases of hypertrophy of the free edge of the gum, the hypertrophied parts should be cut away. Tonic and astringent mouth-washes should be used. If there is any pain, it will be found useful to paint the gums with tincture of iodine and spirits of camphor in equal parts.

Hypertrophy or Morbid growth of the gums. This is an

excessive development of the fibrous structure of the gums ; the alveoli, in excessive hypertrophy, being always affected.

In simple hypertrophy, the gums are thickened, and tartar collects round the necks of the teeth. It is found in connection with caries, badly fitting dentures and regulation plates. It sometimes appears in connection with partially erupted wisdom teeth.

Treatment.—If due to caries, or an erupting wisdom tooth, remove the tooth ; if to a badly-fitting denture or regulation plate, remedy the defect in either, and use an astringent mouth-wash. In cases where there is only thickening of the gums, remove all tartar, scarify the gums and rub in tannic acid.

Excessive Hypertrophy is when the alveolus is affected.

Diagnosis.—The gums first become slightly thickened, this goes on until the surface becomes nodulated, and continues until the teeth are completely enveloped. In parts, the gums are somewhat roughened, being due to the lengthened papillæ of the gum. In some rare cases, the whole of the mouth becomes involved, leaving only the surface of the crowns of the teeth exposed. In time, the teeth become loose and fall out. The gums appear of a darker colour than normal, are very sensitive, and bleed from the slightest injury. In some cases there is a peculiar itching sensation.

Treatment.—Remove the mass, also the teeth and alveolus ; arrest the hæmorrhage by means of the actual cautery. Afterwards, use an astringent mouth-wash.

Pyorrhæa Alveolaris, or Rigg's disease. In this disease there is a progressive destruction of alveolo-dental periosteum, accompanied by an absorption of the alveolar processes : there is also suppurative inflammation of the gums.

Diagnosis.—At the first appearance of this disease, the margins of the gum are inflamed, slightly thickened, painful, and bleed at the slightest touch. As the disease advances,

the gum has a tendency to separate from the neck of the tooth; the tooth becomes loose, and on applying pressure to the gum, pus wells up between it and the neck of the tooth. On passing a probe between the tooth and its socket, a pocket will be felt, this being caused by the destruction of the periosteum. This pocket may only extend a little way, or perhaps as far down as the apex of the root; it extends in a longitudinal direction towards the apex where it widens out somewhat. The pocket may, however, extend symmetrically round the tooth. This destruction of periosteum is attended with absorption of the alveolus, extending in the same direction as that of the periosteum. There is generally present a dark coloured patch, or ring, of hard tartar, round the neck of the tooth, which is probably derived from a secretion from the periosteum.

Pyorrhœa alveolaris may arise either from constitutional predisposing causes, such as gout, rheumatism, struma, diseases which affect the circulation, and severe fevers, as typhoid, or from local predisposing causes, viz,—the irritation caused by the presence of tartar.

There is, however, some difference of opinion as to the origin of this disease.

Dr. Black maintains that it is of local origin, while Mr. Bland Sutton states that it is of constitutional origin, and considers it a general disorder, but that it has to be treated locally as well as constitutionally.

Treatment.—The first thing is to remove all teeth which are hopelessly loose. Then thoroughly scale and clean the remaining teeth, taking care that all particles of tartar are removed. The pockets formed by the destruction of the periosteum, should be syringed out with a solution of perchloride of mercury (1 in 500). Hydrogen peroxide, or any other effective germicide may be used. Following this, pack the pockets with pure copper sulphate, or aromatic sulphuric

acid may be used, but I believe the former is generally found to be most effective. The application should be renewed every two or three days. The patient should be advised to keep the teeth well cleaned, to use a soft brush, and to brush the teeth lengthways and not across, as by this means the pockets are less likely to become blocked with the débris of the mouth. The patient should also paint the gums with a saturated solution of tannin in eau-de-cologne. In the more advanced stages of this disease, the treatment consists in removing the diseased margins of the alveolar process. It is, however, a disease very difficult of treatment, and it frequently re-occurs.

Stomatitis. This term is generally used to imply inflammation of the mucous membrane lining the mouth. There are several varieties.

Simple Stomatitis generally occurs in children, at the period of early dentition. It may however occur through exposure to cold, or from hot and stimulating food.

Diagnosis.—It first appears in slightly elevated, reddish, glistening patches, which afterwards coalesce, and appear as ordinary inflammation. It is very seldom accompanied by any severe pain, but there is generally slight feverishness.

Treatment.—As a rule, it is cured by the administration of an aperient, and the use of an emollient mouth-wash.

In *Chronic Stomatitis* the inflammation appears nodulated and the interstices of the teeth are filled with a substance of cheese-like consistency composed of cast-off epithelium. The papillæ of the tongue are abnormally prominent, the whole substance of the gum is thickened, tartar collects round the teeth and the breath becomes foetid. If, at this stage, treatment is not applied, pus will be discharged from round the necks of the teeth, and the alveolus becomes involved.

This form of stomatitis occurs through uncleanness, dyspepsia, syphilis, and the continued use of mercury.

Treatment.—Cleanse the mouth thoroughly, scarify the gums and rub in tannic acid. The use of an alkaline mouth wash, and painting the gums occasionally with iodine will be found very beneficial.

Follicular, or Aphthous Stomatitis.—This form of stomatitis most frequently occurs during early childhood (i.e., from the commencement of dentition to the end of the third year) although it is common to all ages. It may arise from the result of measles. It is not usually accompanied by any constitutional disturbances, although it may be preceded by fever, restlessness and loss of appetite. It generally occurs through some derangement of the digestive organs.

Diagnosis.—It appears first in the form of individual and inflamed follicles as red spots; these quickly soften down, and pass into small, sharp, ragged-edged ulcers. These ulcers mostly occur on the frænum, in the sulcus between the lips and gums, on the under surface of the tongue, and on the inside of the cheek. They are very painful and sensitive.

Treatment.—Correct all digestive disturbances and apply locally Mel Boracis or Potassium chlorate. If the ulcers, besides being painful, are not disposed to heal, they should be touched with Nitrate of Silver.

Ulcerative Stomatitis, most commonly occurs in children, between the age of five and ten years; it may however occur in adults. It may be caused through some irritation, such as a carious tooth, or an abrasion; it also occurs through poor food or bad hygienic surroundings.

It generally commences at, or near, the free edge of the gums. It occurs more frequently in the lower, than in the upper jaw, and generally on one side of the mouth only, although it may spread, until the whole of the mouth becomes involved. It usually originates in the front part of the mouth, and it is only in severe cases when it extends to the molar region.

Diagnosis.—The gums first become swollen, congested, of a pimply appearance and bleed on the slightest touch. Ulceration soon sets in and pus wells up from round the necks of the teeth and alveolar processes. In its fully developed form, the surface of the ulcer is covered with a dirty-white, or yellow, material; on removing this, there will be seen a number of scarlet points on a yellow ground. The edges of the ulcer are sharp and ragged. The mucous membrane of the cheek if it comes in contact with the ulcer soon becomes involved.

Treatment.—There are several methods of treatment. I believe that most generally used is Dr. West's, i.e. —Chlorate of Potassium administered internally and applied locally. The dose is grain iii. to a wineglass of sweetened water, administered every 4 hours, for children up to the age of five years; above that age gr. v. The bowels should be regulated, the constitution supported, and hygienic surroundings attended to. If the ulcers are very sensitive apply Nitrate of Silver.

Gangrenous Stomatitis or *Cancrum Oris*. This is a rapidly spreading gangrenous inflammation, usually attacking the cheeks, and caused by thrombosis of the capillaries. It more commonly occurs in children of debilitated constitutions between the age of 2 and 4 years, although it may occur at any period between the first and tenth year. It is often the result of scanty nourishment, improper clothing, and damp unhealthy places of abode.

Diagnosis.—It first appears as a thick hard swelling on the face, in the centre of the cheek. The skin covering the swelling is shining, tense, and hard but free from tenderness. In the centre, there appears a red blotchy spot. At this stage, on the mucous surface of the cheek, corresponding to the external red spot, there will be found an irregular ulcer, with livid red edges. This ulcer is not very sensitive, but gives forth a gangrenous odour, and induces profuse sali-

vation. Destruction of the tissues occurs by sloughing, and there is soon an opening right through the cheek.

The course of this disease is extremely rapid, and death usually occurs in seven or eight days. Its strange features are:—the entire absence of pain, and scarcely any constitutional disturbances.

Treatment.—Dry the soft parts; remove all gangrenous portions, and cauterize with Nitric Acid. The constitution must be well supported, and disinfectant mouth-washes should be used.

Scurvy. This disease is caused by want of vegetable diet. It is attended by various constitutional disturbances; these, however, I do not intend to mention, but shall confine myself to its effects on the mouth.

Diagnosis.—The gums become sore and bleed readily; they are also swollen, spongy, and of a livid redness. In the progress of the disease, the gums become more swollen and livid, forming a black spongy mass, which entirely envelops the teeth, leaving only the surface of the crowns exposed. In severe cases, the crowns of the teeth are wholly covered, and on the surface of the mass large sloughs are formed; these sloughs occur through the friction arising from mastication. The teeth become loose and fall out. There is also a large amount of hæmorrhage, which is difficult to arrest.

Treatment.—In the treatment of scurvy, both local and constitutional means are required. The local treatment is to keep the mouth quite clean, and to use antiseptic and astringent mouth-washes. The constitutional treatment consists of a plentiful vegetable diet and the administration of vegetable acids, such as lemon juice.

I will now draw my paper to a close, with a few brief notes on some of the swellings and tumours found in the

mouth, of which there are various forms, malignant and otherwise.

Polypus of the gum. This is the most simple form of swelling found in the mouth. It is merely an hypertrophy of the gum, generally caused by local irritation, such as tartar, the ragged edge of a carious tooth, or the sharp edge of a root. It is of the same appearance as gum tissue, and is painful to the touch.

The treatment consists in removing all sources of irritation, and the growth should be cut off, otherwise it may increase in size and resemble an epulis, from which, however, it is distinguishable, in that an epulis is found to arise from the periosteum, and a polypus from the gum.

Fibroma (fibrous or common epulis). This is a hard, fleshy, smooth, and slightly lobulated growth, of the colour of gum tissue. It is composed principally of fibrous tissue, and is of slow growth. It generally arises from the periosteum lining an alveolus, and occasionally from the periosteum of the tooth. If the growth comes in contact with the opposing teeth, ulceration of its surface is very likely to occur.

The treatment is to remove the growth and also the adjacent alveolus. If the growth is only a small one, it will generally be sufficient to only scrape the alveolus. In a case where the epulis arises from the periosteum of the tooth, it is necessary to remove the tooth. As a rule the growth occurs between two teeth, and both teeth have to be removed. After the removal of the growth, the actual cautery should be applied, not only for the purpose of restraining the hæmorrhage, but also for destroying all traces of the epulis. An antiseptic mouth-wash should also be used.

Myeloid sarcoma (myeloid epulis) is much more rare than the fibrous variety.

It is a vascular tumour, of a purplish-red colour, and soft

spongy consistency. In appearance it is somewhat like a mulberry. It grows more rapidly than a fibroma. This variety of epulis arises from the bone itself, beneath the periosteum.

The treatment is to remove not only the growth, but also that portion of the bone from which it arises. Restrain the hæmorrhage by means of the actual cautery. After removal of the growth, an antiseptic mouth-wash should be used.

Epithelioma (malignant epulis). This variety of epulis is of very rare occurrence. When occurring in the gums it is generally caused by some long-continued irritation, such as the ragged edge of a tooth or root. In the upper jaw, it is very liable to creep up into the antrum (creeping epithelioma) and is not uncommonly mistaken for necrosis.

It appears first as a warty fissure ; this afterwards becomes an ulcer, with everted and indurated edges.

The treatment is to freely remove the diseased parts, and, if necessary, the maxilla.

Papilloma, or papillary tumour of the gum, is a growth of a warty character ; it is, however, of rare occurrence.

This growth is produced by hypertrophy of the papillæ of the gum, and in appearance resembles a wart.

The treatment consists in removing the growth.

Vascular Tumours of the gums. These are growths which sometimes occur on the gums. They first appear as a bright red pimple, slightly raised from the surface of the gum. This gradually gets larger, and may extend along the gums, even in front of and behind the teeth. They bleed readily when touched with the tooth-brush. They more often occur in the incisor region.

The treatment consists in removing the growth.

In conclusion, gentlemen, I must thank you for your kind attention, and trust I have not trespassed too far on your time and patience.

British Journal of Dental Science.

LONDON, JANUARY 15th, 1895.

ANTITOXIN.

Dentists are expected now-a-days to know something of Bacteriology and Antiseptics. But we must also keep in touch with some of the other facts arising out of the new Science, and which are becoming matters of common knowledge and topics of every-day conversation. Such an instance is the treatment of Diphtheria by Blood-serum obtained from the Horse. At the time when M. Roux communicated his statistics to the Health Congress at Budapest we called attention, in a short annotation, to the remarkable results obtained in a Hospital for Sick Children in Paris. And now, week after week, the Medical journals report cases treated in a like manner in this country.

It is now recognised that Diphtheria, which in spite of improved Sanitation seems to be increasing, is due to the invasion of a specific micro-organism. The point of infection is in the region of the fauces and the formation of a "membrane" on the palate and tonsils, liable to extend down the larynx, is one of the characteristic signs. A poison, or toxin, is the result of the growth of the special bacillus, and its absorption into the system accounts for the constitutional symptoms. Even when the patient survives the local manifestations in the throat, there may follow paralysis of various groups of muscles. Behring found by experiment that by gradually-increasing doses of toxins animals might be rendered insusceptible to what would ordinarily be a fatal quantity; toleration was thus established; in other words, the animal became "immune." The theory is that some substance is formed which protects the individual from the action of bacteria and their products.

If then a larger quantity of this protective material, or antitoxin, can be obtained from an immunised animal than would be normally, and only slowly, formed, and if this be introduced into a patient's circulation then the toxin would cease to exercise its baneful influence. It is supposed that the antitoxin present in the serum of the blood is the result of the activity of the tissue-cells of the body, stimulated by the introduction of the toxin; and it has been suggested that it may become possible to separate the antitoxin itself from the serum. At present the Horse is the animal selected as a "feeder" for the supply of the immunised serum, and to obviate inevitable criticism and possible danger, great care is exercised in the selection of healthy animals. In order to prove the absence of Glanders, the horse is previously tested by an injection of mallein, and later, a graduated series of injections of Diphtheria toxin secures immunity in about three months. There is reason to believe, according to Dr. Klein, that this time may be much shortened in future. The anti-toxic strength of the serum is tested upon guinea-pigs so as to secure a proper standard. A guinea-pig weighing 500 grammes receives an injection of $\cdot 01$ c.c. of the serum, and twenty four hours later $\cdot 5$ c.c. of a living Diphtheria culture, strong enough to kill an unprotected guinea-pig in twenty-four hours.

This antitoxin treatment is quite a new departure. As Dr. Sims Woodhead has pointed out, it is quite different from vaccination or the injection of tuberculin. There have, however, not been wanting certain protests against it. Dr. Hansemann has already criticised some of the theories upon which it is based and indicated possible dangers, but before long we may expect a large accumulation of statistics. The Metropolitan Asylum Board has taken an interest in the matter, and has authorised a bacteriological examination to be made in the cases of Diphtheria patients admitted to their Hospitals. Cultivations are also recommended to be carried out when the patient is to be discharged, with a view of ascertaining the non-infectious condition of the fauces.

INFILTRATION-ANÆSTHESIA.—Dr. Schleich has used this new method of local anæsthesia in such operations as laparotomy. A very weak solution of cocaine is employed—1 per mille. It is dissolved in a solution of common salt, 2 or 3 per cent.; for, according to Liebreich, distilled water if injected subcutaneously has a toxic effect. A small spot of skin is first anæsthetised with Chloride of Ethyl and then a few drops of the cocaine solution are injected. The syringe is then pushed through this insensitive area and the process repeated until the field of operation is surrounded. Dr. Schleich has employed this method in about three thousand operations with success, and at the meeting at which the paper was read a man was operated upon for a large syphilitic abscess in the arm. The whole proceeding only lasted from eight to ten minutes including the production of anæsthesia and the patient felt absolutely no pain.

URICEDIN.—This is a white, granular substance, consisting of citrate of potash, sulphate of soda, chloride of sodium and citrate of lithium. Its use is being strongly recommended in cases of uric acid diathesis, Dr. Langstein, of Teplitz-Schonau, having employed it with excellent results in fifty cases of gout during the last bath season. The doctor first tried it upon himself when troubled with increased uric acid, and after having failed to obtain permanent relief from the usual alkaline treatment. When a daily dose of 150 grains had been gradually reached, the pain diminished in a very marked degree. Dr. Mendelsohn, who brought Uricedin before the notice of the International Medical Congress, stated that 300 grains could be taken daily without bad effects. Perhaps some of our readers who are tempted to treat Pyorrhœa Alveolaris from the uric acid aspect, may feel inclined to try the effect of Uricedin. Citrate of Lithium has already been recommended.

RECOVERY FROM BULLET WOUNDS.—*The Lancet* reports a case from the Bradford Infirmary of a man with a bullet

wound of the abdomen. About four hours after the injury a vertical incision was made, the patient being under ether. A wounded mesenteric vessel was ligatured, and the intestine carefully examined throughout. It was found to be perforated in four places, making eight wounds ; there were also three wounds of the mesentery. The bullet was discovered and removed, the perforations were closed by fine silk sutures. The abdominal cavity was irrigated with hot boric acid solution and sponged out as dry as possible. The operation lasted 125 minutes, and the patient was much collapsed. Feeding by the mouth was resumed on the eighteenth day, nutrition until then being maintained by enemata. The patient was discharged in 48 days, and was quite well two months later. When receiving the injury he had been drinking all day and had taken little food, and this latter fact was no doubt an important element in the successful issue of the case.

XEROSTOMIA.—A woman, aged 30, was recently shown, at the Clinical Society of Manchester, whose mouth was absolutely dry. There was complete arrest of secretion of all the salivary and buccal glands ; also an enlargement of the parotid glands. The abnormal condition commenced some four years previously until when the patient was in good health. There was now anæmia, but all the organs appeared healthy. Dr. Harris, who showed the case, referred to the very few instances of the affection which had been recorded. He regards Xerostomia as a functional nervous affection, and thinks the parotid enlargement is probably due to a similar cause. Mr. Jonathan Hutchinson has recorded two cases of relapsing parotiditis, one of which was associated with a certain amount of dry mouth.

Abstracts of British & Foreign Journals.

MODERN EXPANSION OF CELL THEORY.

By Professor JOSEPH COATS, M.D.

The position of the nucleus has been greatly elucidated by the researches of a number of observers, of whom the principal are W. Flemming, of Kiel, and Strassburger. From these observations, it appears that in the new formation of tissue by division of cells, not only does the nucleus take the leading part, but that it goes through an interesting and striking series of changes. The resting nucleus with its obscure fine fibrous network, transforms itself into an active body, in which the fibres, becoming thicker and more prominent, go through extraordinary movements and arrangements till they separate into two groups, each of which becomes the nucleus of a separate cell. This method of nuclear division, which has been called karyomitosis, or indirect division, as contrasted with the direct division of Remak, has been now observed in so many growing tissues that it seems to be driving the direct method from the field. Karyomitosis has been observed in pathological new formation no less than in normal growth, and the identity of the two has been thus fully established. In all quickly growing tumours, where, as in a growing tissue, the process of cell multiplication is so active that there is a reasonable expectation of finding examples of the process in actual progress, we find ample evidences of this special form of nuclear activity.

The nuclei of tissues are readily brought out and rendered prominent by certain methods of staining or dyeing. Carmine is the dye-stuff originally used for this purpose. But histological research has received extraordinary assistance from the use of aniline or coal-tar dyes. The number of these is legion, and much industry has been expended in experimenting with them in various combinations and under various circumstances, with the result that our knowledge of the cells and especially of the nuclear processes, has been greatly advanced. It is by means of these aniline dyes that Flemming and others have been enabled to demonstrate the processes of nuclear division.

The importance of the nucleus in relation to nutrition has been further shown in the interesting fact that where, in the living body, a piece of tissue dies, or, in pathological language there is a necrosis of tissue, the nuclei disappear, or at least become inaccessible to those dyes of which I have been speaking. This is so much the case that the disappearance of the nucleus, although not occurring instantaneously on the death of the tissue, may be taken as a test of the existence of a local necrosis as an actual circumstance during the life of the individual. The demonstration of this fact belongs to one of the most distinguished of living pathologists, Professor Weigert of Frankfort.

The importance of the living cell in pathological processes has received further exemplification from the admirable researches of Metchnikoff. I cannot indeed subscribe to all the doctrine of this indefatigable and resourceful observer, and more especially I cannot agree to his endeavour to reform our use of the term inflammation, but I must admit the beauty and ingenuity of his observations and the soundness of many of his deductions. I cordially acknowledge also that his study of pathological processes in the lower and simpler forms of animal life has opened up a sphere of work of the utmost promise. Metchnikoff's observations have regard to the relation of the living cells of the body, to the intrusion into the body of deleterious and other extraneous matters, and more especially to the intrusion of bacteria or microbes. In Metchnikoff's view, the invasion of hostile microbes is, in many cases, met by a mustering of living cells with a view to the protection of the body. It is well known that living cells, and especially certain kinds of cells, are capable of taking into their substance solid particles of matter. Many unicellular animals live by englobing solid nutritious particles and digesting them in their protoplasm. In the higher animals the leucocytes of the blood and lymphatic fluid are the principal possessors of this power of taking up and dealing with solid particles, although it is not limited to them. It is asserted then, that when the body is invaded by microbes which are capable of producing disease, the cells, in most cases the leucocytes, meet them and endeavour, by englobing them and digesting them, to dispose of them. There arises in this way a struggle for existence between two different kinds of cells—the microbes and the leucocytes or other animal cells. If the cells of the body are successful then the disease is arrested, but if the microbes are able to survive

n sufficient numbers then the disease goes on. Now I am not prepared to admit that Metchnikoff's doctrine of phagocytosis is to be regarded as a full and complete explanation of all the facts concerned ; but there is no question that Metchnikoff has much advanced our knowledge by pointing out this important function which undoubtedly is possessed by many cells. It may here be added that this is an example of functional activity in the cells, and like other functional actions, it resides in the protoplasm, whilst the actions of nutrition and formation have their seats in the nucleus.

British Medical Journal.

Reports of Societies.

STUDENTS' SOCIETY, NATIONAL DENTAL HOSPITAL,

A meeting of this Society was held on Friday, Dec. 7th, at 8 o'clock. C. W. Glassington, Esq., President, in the chair.

The minutes of the previous meeting were read by the Hon. Sec., and confirmed, and the President gave the usual welcome to the visitors present.

CASUAL COMMUNICATIONS.

Mr. E. G. CARTER, who was prevented from attending, sent a very good specimen of a case of Gemination occurring in the left upper molar and wisdom teeth.

Mr. GLASSINGTON asked if anyone had used Saccharin as an antiseptic.

Mr. GREETHAM said Dr. Miller, of Berlin, introduced Saccharin in a mouth-wash a few years ago, and he had used it with very satisfactory results. He (Mr. Greetham) had brought it to the notice of a medical friend of his, who had used it very successfully in diphtheria.

The President then called upon Mr. E. A. Wheeler for his paper on "Some Diseases of the Mouth," which is published on page 68.

An interesting discussion followed, and Mr. Wheeler having replied, a hearty vote of thanks was accorded to him for his paper, and the meeting then adjourned.

Dental News.

OPENING OF THE NEW DENTAL HOSPITAL AND SCHOOL AT EDINBURGH.

The inauguration of the new premises, Chambers Street, for the Edinburgh Dental Hospital and School, took place on December 13th, in the presence of the Lord Provost and a number of the friends of the Institution.

Mr. Bowman MacLeod (Dean of the Dental School) said—My Lord Provost, ladies and gentlemen, in making a few introductory remarks on behalf of the directors, I am fortunate in not requiring to make any prefatory apology for requesting the good office of your Lordship, and the presence and assistance of so many distinguished citizens at the formal opening of these new comfortable and commodious premises. I think we are justified in the course we have taken, seeing that the object and aim of our existence as a benevolent institution is the relief of suffering. (Applause.) That your lordship has more than a Magisterial interest in us we are all aware; you have for years taken a personal and very active interest in our work, and have on many occasions given the Hospital the benefit of your business acumen and advice, and we deem ourselves fortunate indeed in having the Right Hon. Lord Provost M'Donald, one of our own directors, to come and declare this building open for the dental relief of the necessitous poor. (Applause.) During the eleven months ending November 31st, we have treated upwards of 12,000 cases, 4500 of these, or more than one-third, being teeth which, by appropriate treatment, have been restored to a sound condition, and rendered capable of properly preparing the food for that unconscious digestion and assimilation so necessary to perfect health. To overtake this great and good work we have the unpaid services of eighteen dental surgeons (three dentists attending on each day of the week) and four medical gentlemen as anæsthetists, who are assisted in their work by forty-five students. This brief statement will, I trust, give the public some notion of the vastness of our labours, and will induce them to subscribe largely and heartily, and enable us to wipe out the debt of £4000 with which we are at present burdened.

The Lord Provost said he had great pleasure in being there

that day to do anything he could to assist this institution. This institution, as some of them knew, had a small beginning; but there was this to be said for it that since its establishment in 1862 it has always gone on increasing. It had occupied various premises in different parts of the city. It went to Lauriston Lane in 1880, and it was there that he first became acquainted with it. He had paid many visits to it there to see its practical work. In the early days of the Institution those connected with it thought they were doing a great work when the number of people attended to was 250. Last year the large figure of 11,621 was reached. In the early days the freewill offerings of patients were only £6. Last year they amounted to £60. That went to show that the people who were attended to at the hospital were of that class who could not have gone to a dentist to pay fees. It was not only doing a great work in that way; but the Hospital and School was also furnishing a thorough training to young men who were going into the dental profession, and to surgeons who desired to take the dental diploma. Any one used to be entrusted with the drawing of teeth. Now it was different. He had much pleasure in declaring the New Dental Hospital and School buildings open, and he had no doubt great good would result to the city from them. (Applause.)

Mr. Hepburn, dentist, proposed a vote of thanks to Mr. Bowman MacLeod and the directors, and Dr. Smith proposed a similar compliment to the Lord Provost for presiding.

The company then inspected the buildings, and tea and coffee were served in one of the rooms.

BIRMINGHAM DENTAL HOSPITAL.

The annual meeting of Governors and subscribers of the above institution was held at the Council House, the Mayor, (Alderman T. S. Fallows) in the chair.

The committee's report stated that during the year £108 10s. had been received in subscriptions, £50 had been received from the Hospital Saturday collection, and the income from rent, charity boxes, registration fees, &c., raised the total receipts to £647 1s. 4d. Against this amount were payments amounting altogether to £696 0s. 4d., but £106 10s. 2d. of this was balance due at the end of the previous year. The report of the Surgical Committee set forth that the number of oper-

ations under ether had decreased during this year by 501, whilst those under nitrous oxide had slightly increased. The fillings in gold had increased 20 per cent., and all the operations for the preservation of teeth had increased largely.

In moving the adoption of the report as a whole, the Chairman said that although the charity was a small one it was performing a great amount of good work. The financial position was not so bad as it appeared to be at first sight, because, although there was a balance to the bad, it was not half so large as at the end of 1893. If they had only received a donation or legacy of £50, as they did in 1893, they would have been in a much better position than formerly. Whilst the subscription list of most charities was decreasing, it was satisfactory to note that that of the Dental Hospital was increasing. The increase was small, the total amount of the subscriptions being £108 10s. as against £104 6s. last year, but still it was gratifying to find that financially the charity was improving.

Mr. William Thomas seconded and the report was adopted.

On the motion of Lieutenant-General Phelps, seconded by Mr. J. A. Jones, the best thanks of the meeting were given to the honorary hospital staff and officers "for the zeal and ability with which they have performed their duties during the past year."

Mr. Breward Neale moved the election of the following honorary officers for the ensuing year:—The Mayor (Alderman T. S. Fallows), president; Lord Calthorpe, vice-president; Mr. J. W. Wilson, hon. treasurer, and Mr. Arthur Addinsell, hon. secretary.

Mr. F. E. Huxley seconded, and the resolution was adopted.

Mr. F. W. Richards moved the appointment of the hon. dental surgeons, and of the hon. auditor.

Mr. A. Turner seconded and the motion was carried.

At the conclusion of the business thanks were—on the proposition of Dr. Haynes, seconded by Dr. J. H. Blakeney, and supported by Lieutenant-General Phelps—voted to the Mayor for presiding.

His Worship briefly replied.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The following gentlemen, having passed the necessary examinations, have been admitted Licentiates in Dental Surgery.

- Ackland, Charles Herbert, Charing-Cross and Dental Hospitals.
 Bennett, Norman Godfrey, Cambridge University, St. George's and Dental Hospitals.
 Butterworth, John, Owen's College and Victoria Dental Hospital, Manchester.
 Cave, Urban Edward, Guy's Hospital.
 Cannell, Charles, Charing-cross and Dental Hospitals.
 Fogg, Ernest, Middlesex and National Dental Hospitals.
 Frost, George Edward, Charing-cross and Dental Hospitals.
 Gartrell, John Herbert, Charing-cross and Dental Hospitals.
 Godfrey, Thomas, Guy's Hospital.
 Hands, Francis William, Masons College and Dental Hospitals, Birmingham.
 Hardy, Herbert William, Charing-cross and Dental Hospitals.
 Headridge, John Parsons, Owen's College and Victoria Dental Hospital, Manchester.
 Howitt, Herbert George, Guy's Hospital.
 Hutson, Edward, Guy's Hospital.
 Jores, George Silva, Charing-cross and Dental Hospitals.
 Lambert, Francis Herbert Lewis, Guy's Hospital.
 Lane, Keith Foster, Middlesex and Dental Hospitals.
 Leigh, William Johnson, Charing-cross and Dental Hospitals.
 Morris, Lionel Frederick, Guy's Hospital.
 Newland, Herbert George, Charing-cross and Dental Hospitals.
 Norman, Harry William, Charing-cross and Dental Hospitals.
 Partridge, Walter Eriencus, University College and Dental Hospital, Liverpool.
 Picton, Edwin, Charing-cross and Dental Hospitals.
 Pike, Walter James, Charing-cross and Dental Hospitals.
 Pilcher, John, Guy's Hospital.
 Prideaux, Charles Sydney, Charing-cross and Dental Hospitals.
 Reeve, Alfred, Charing-cross and Dental Hospitals.
 Reeve, Norman, Middlesex and National Dental Hospitals.
 Rogers, John Percival, Charing-cross and Dental Hospitals.
 Rooke, Frederick James Faulkland, Middlesex and Dental Hospitals.
 Sibson, Percival Reginald, Owens College and Victoria Dental Hospital, Manchester.
 Stabb-Johnson, Edward William, Guy's Hospital.
 Steynor, Arnold William, Mason College and Dental Hospital, Birmingham.
 Talintyre, Charles, Charing-cross and Dental Hospitals.

Timms, Walter Thomas Day, Middlesex and National Dental Hospital.

Torpey, Herbert James, Charing-cross and Dental Hospitals.

Watson, Robert, Charing-cross and Dental Hospitals.

Woods, Joseph Ainsworth, University College and Dental Hospital, Liverpool.

SKILL *versus* MATERIAL.

At the Bloomsbury County Court, before Judge Bacon, Q.C., the case of "Penfold v. Foister" was heard. It was an action in which the plaintiff, Mr. T. Penfold, a dentist, of 30, York Street, Portman Square, sued the defendant, Miss Foister, an independent lady, of 21, Duke street, Portland place, to recover the sum of £24 3s., value of a set of false teeth.

Mr. McIntyre was counsel for the plaintiff; and Mr. Greenfield for the defendant.

The plaintiff's case was that the defendant consulted him about her teeth, with the result that he advised her to have a set made. The lady had a false top set but only six teeth on the lower jaw. There were many attendances, and while at Hastings Miss Foister wrote expressing her satisfaction at the teeth, and stating that she could eat with comfort. In the meanwhile, according to the custom of the profession, plaintiff, who had retained her old top set of teeth, smashed them up and allowed her £1 for the old gold that the plate contained. The lady then wrote back demanding the return of the old plate, for which she had paid £12 12s. She also alleged that the teeth did not fit, that she could not eat, and returned the bottom set. Plaintiff was willing at any time to make good any defects, but owing to the defendant's insulting letter he declined to do any more until she had tendered him an apology.

In cross-examination, plaintiff said that the teeth might not have fitted at a certain time owing to the change of the mouth. His charge was one guinea a tooth, and he was of the opinion that the most difficult part of the operation was preparing the patient's mouth. He remembered Miss Foister saying that when she ate anything the teeth jumped out. (Laughter).

You kept the lady's top plate and broke it up without her

consent?—Yes, I kept it because I did not want her to wear it until she was used to mine.

You wrote her the following letter demanding an apology, and—

His honour—You need not read that, because to my mind there is nothing so foolish as writing letters when there is an exhibition of temper on both sides.

Mr. Greenfield—What would be the cost of the material used in the set of teeth?

Plaintiff—I am not prepared to answer that, it is not right to the profession.

Would I be right in saying that the work and material would cost about 18s.?—I cannot answer that.

Then you cannot deny it?—It is not material; it is skill. The set takes two or three days to make, and I frequently charge twenty guineas.

Then you leave a very good margin for profit.

His Honour—If a woman will go to a West-end dentist, where big prices are charged, she must pay for it. If she had gone to other dentists she might have got the set for 20s.

Mr. Campbell, another dentist, said that in his opinion the material would cost £3 or £4, and the work would occupy a few days. It was not his custom to destroy any teeth plates left in his care by patients.

For the defence Miss Foister was called, and deposed that the teeth did not fit properly, she was unable to eat with them, and they hurt her very much. She had paid £8 into court for the upper set she had kept.

Mr. George, a dentist, of 86, Tottenham Court road, also of Monte Carlo, stated that he had examined the teeth and found them to fit very badly.

Mr. Greenfield—What would you say the material and labour cost?

Witness—About 18s.

His Honour—What would you make the teeth for?

Witness—£5 5s.

If the work and materials cost only 18s.?—Yes.

His Honour—Then you would have a fair profit. (Laughter).

In the end his Honour gave judgment for the plaintiff, allowing the defendant £1 for the teeth plate plaintiff had smashed. He, however, disallowed the plaintiff's costs.

ARTIFICIAL TEETH DISPUTE.

Mr. Commissioner Kerr tried a case recently in the City of London Court wherein the plaintiff, Mr. Josiah P. Costa, dentist, of 114 Leadenhall Street, E.C., sought to recover the sum of £8 8s. for artificial teeth supplied to the defendant, Mr. Arthur Hill, of 27 Upper Thames Street, E.C. Mr. Carver, counsel for the defendant, said the teeth did not fit, and the defendant had consequently refused to pay for them. The plaintiff said he supplied the defendant with a complete set. The defendant said that one of the cases did not fit, and he expressed his readiness to make them fit. To put the teeth in he had to remove some roots of the wisdom teeth. Mr. Commissioner Kerr : Wisdom teeth ; What an awful misnomer that is for the majority of mankind ! Further evidence was given, after which the learned Judge said that a set of teeth would never fit the first or the second time. The plaintiff must have an opportunity of making the teeth fit, or else the defendant must call in a dentist to show that they never would fit. The plaintiff said the defendant declined to let him make any alterations. Mr. Commissioner Kerr said he would adjourn the case "for the plaintiff and defendant to be a little bit more sensible." If it was impossible to make the teeth fit, then the defendant would escape from payment. The plaintiff : I will make him an entirely new set if they do not fit.

CHEAP TEETH.

At the Bloomsbury County Court Judge Bacon heard an action in which Mr. John Browning, an ex-army captain, sought to recover from the defendant, Mr. Jarrow, a local dentist, the sum of £1.

Plaintiff said that he ordered a full set of false teeth from the defendant, for which he was to be charged 30s., and paid £1 on account.

His Honour : Had you lost all your teeth ?

Plaintiff : Yes. I went to the defendant to have false teeth fitted, and the man put me to great torture, lacerating the

jaws frightfully. When the set was delivered, two teeth were found to be missing, the set would not fit, and instead of the back clashing properly the rubber of the gums met. (Laughter.)

His Honour : Did you not miss the two teeth when you were having the set fitted ?

Plaintiff : Well, I am not a dentist, and again I was so badly tortured.

His Honour : But a man is not a novice who has lost all his teeth. (Laughter.)

Plaintiff (with some dignity) : I lost them in Her Majesty's service while fighting in India.

His Honour : If I give you a verdict for the return of the sovereign you have paid, how about the teeth : they may be worth something to defendant ?

Plaintiff (holding the teeth in his hands) : I'll give them to anyone who will take them. (Loud laughter.)

His Honour : Very well, judgment for £1, but return the teeth to the defendant.

Plaintiff : Oh, yes. (More laughter.)

MACDONALD MANUFACTURING COMPANY (LIMITED).

This company was registered on Dec. 1st with a Capital of £1,000, in £1 shares. Objects : To acquire, take over as a going concern, and carry on the business of an artificial-teeth manufacturer, carried on by John P. Macdonald (trading as the Macdonald Manufacturing Company, London), at 122 High Holborn and at 17 Southampton Row, London, W.C. ; 118 New Road, Chatham ; 152 Milton Road, Gravesend ; 36 High Street, Dartford ; and 51 High Street, Guildford ; and to enter into an agreement for the purpose. The subscribers (who take one share each) are :—J. Macdonald, 29 Piccadilly, Manchester, artificial teeth manufacturer ; J. P. Macdonald, 19 Bernard Street, Russell Square, W.C., artificial teeth manufacturer ; A. Macdonald, 1 White Street, Seedley, Pendleton, assistant ; S. Macdonald, 190 Wellington Road, Eccles, assistant ; C. Martin, 47 Park Avenue Long-

sight, assistant ; S. Brown, 98 Brunswick Street, Ardwick, assistant ; P. Musgrove, 17 Southampton Row, W.C. The first directors (to number not fewer than three nor more than seven) are : James Macdonald (chairman), John P. Macdonald, and Alexander Macdonald. Qualification, £10. Remuneration, £10 10s. per annum divisible.

QUALIFIED AND UNQUALIFIED DENTISTS.

The Southampton Magistrates, have had before them cross-summons for assault taken out by Mr. Charles Morgan, dentist, against Solomon Arbus, a hairdresser, and by Arbus against Morgan.

Arbus's case was that Morgan came into his shop, interfered with the business of a dentist which he also carried on although he was not registered, compelled him by threats to restore to clients money he had charged for services rendered, and put his fist in his face and threatened to knock his head off. Morgan denied the assault and averred, through his advocate that Arbus acted as a dentist without the slightest right to do so, and charged a man £4 for doing that for which he had no authority. The fact was that Morgan had arranged to have a room at Arbus's place and carry out any dentistry that might be required of him there. But Arbus proceeded to do the work himself, and, as Morgan asserted, charged extortionate sums to foreigners who visited the establishment. On the day the alleged assault was said to have been committed he was sent for and he told a man that Arbus was an unqualified man and had no right to charge for services rendered. He sent for the police, and Arbus then returned a portion of the money. Arbus then pushed him out of the shop, causing a bruise on his arm.

The chief constable said he had received complaints as to Arbus's conduct, and on one occasion visited his establishment and was the means of compelling him to refund some of the money he had received from a Frenchman whose teeth he had attended to. If the man had not been going away the following day he should have brought a charge against Arbus.

The Magistrates said that was not relevant to this case, and could be only gone into on a separate charge. The Magistrates fined Morgan 5s. and costs, and dismissed the case against Arbus.

VACANCY.

National Dental Hospital, Great Portland Street, W.—The post of House Surgeon is vacant. Applications to be made to the Secretary by the 24th instant.

APPOINTMENT.

Harry Owen, L.D.S.I., has been appointed Honorary Dental Surgeon to the Kidderminster Hospital.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents]

THE DENTAL LABORATORY.

To the Editor of the "British Journal of Dental Science."

SIR,—There are several points in the article on this subject, in your last issue, which are worthy of fuller treatment. With regard to the work-bench: anyone who has tried a high bench to stand at, with the occasional use of an artist's sloping seat-rest, will not be likely to return to the use of a low bench and stool. The pin or tail-vice should never be fixed to the work-bench, as the jarring and dirt caused by rough hammering and filing interfere seriously with all other work; the proper place for this is on the plaster bench, so that all rough dirty work can be kept together. So far as my own experience goes, the best arrangement under the bench-peg, is, first, a shallow drawer for small tools, then an ordinary filing-tray for gold filings, and under this, a larger tray for vulcanite waste; the drawer and both trays having the same front curve as the

bench, and sliding easily backwards and forwards. The legs also are better if not placed under the dividing rib, as shown, but more to the right, so that support is obtained for a heavy blow, without jarring the whole bench, for this reason the small anvil is best mounted on a block of lead, which can be placed over the leg when used, the 'jarring' of the board is a great nuisance to others who are working at it, and this cannot be avoided if the anvil or beak iron is used over the filing peg.

With regard to furnaces, I think any experienced user will bear me out in the statement, that a gas furnace will do the whole of the melting required in an average laboratory, in less time than is required to get a coke furnace ready for work, and to clean up the mess made. Irrespective of this, the irregular working and risk of spoilt and lost metal in a coke furnace are alone sufficient to condemn it. If a firebrick furnace is used, the proper mortar to build it with is not soft fire-clay, but a hard refractory clay, mixed with a solution of silicate of soda; the latter sets hard and binds the bricks together in a solid mass, the former never sets firm. A ladle with a vertical handle, as shown, is not used by practical moulders in sand, for the simple reason that it requires a rest to pour steadily, and this rest is liable to disturb the sand; a ladle with a horizontal handle can be used with perfect steadiness, without any rest. Even in steel melting, where a vertical handle is absolutely necessary in lifting the crucible, it is generally put aside and replaced by a single or double horizontal handle for pouring, unless the mould is a metal one, and careful pouring is not required. A cast-iron ladle is satisfactory for lead and tin melting, but at the temperature required for cleaning zinc with hydrochloric acid, cast iron is generally exceedingly brittle, and unless very unnecessarily clumsy and heavy, it is very liable to fracture, the result being, to say the least of it, unpleasant. If ladles of this class are used, they should be malleable castings, and malleable cast ladles can easily be obtained any thickness; in my own experience, a thick ladle is a poor investment, owing to its weight and slowness of working.

Yours truly,

THOS. FLETCHER.



"MASSETER" wishes to know if any of our readers can enlighten him as to the cause of severe trismus occurring *after* the extraction of a lower molar tooth, and also what is the best mode of treatment, as trismus is a subject on which our text books say very little.

A case of this kind came under our correspondent's notice recently. The patient had no signs of approaching trismus before the extraction, which was successful, but the patient had to summon a medical man in the middle of the night, not only on account of pain, but because the patient thought she would be suffocated; to use her own expression—"her throat was making up!"

Dental Hospital Reports.

WORK DONE at the Victoria Dental Hospital of Manchester
during the month of December, 1894.

Number of Patients attended	640
Number of Extractions	429
Number of Extractions under Anæsthetics	116
Gold Stoppings	32
Other Stoppings	64
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	166
Crowns	7
Irregularities	34
Total	848

JAMES A. LEES, *House Dental Surgeon.*

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only, and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
6. The Journal will be supplied direct from the office on PREPAYMENT of subscription as under :

Twelve Months (post free) - - 14s. od.

Post-office Orders to be made payable at the Langham Place Hotel Office to G. E. Skliros, 289 & 291, Regent Street, W. A single number sent on receipt of seven (penny) stamps.

British Journal of Dental Science.

No. 649. LONDON, FEB. 1, 1895. VOL. XXXVIII.

ORBITO-MAXILLARY DISEASES.*

By W. J. COLLINS, M.D., M.S.Lond., F.R.C.S.

Although it is nearly four years since the first and last time I had the honour of addressing your Society, I retain at once a lively and pleasant recollection of that occasion. I spoke of "Associated and related Ocular and Dental Diseases," and although I had set down in a dull and prosaic fashion the results at which I had arrived, from a painstaking and not inconsiderable experience and subsequent reflection thereon, I was unduly surprised and not a little shocked to hear in the discussion that followed, such dreadful terms as "iconoclastic" and "sceptical" invoked to describe my very modest conclusions. As the topic on which I speak to night—one on which your specialty touches mine—that of "Orbito-Maxillary Diseases," is not wholly dissociated from that of my previous paper, perhaps I may be permitted to take up the thread of the narrative where that discussion left it, and in pursuing the matter, I hope, by taking due warning from previous criticism, to succeed in being more constructive and less destructive in what I have to say.

I have performed the painful task of reading through my paper of March, 1891, and looking at in the light of the subse-

* Read before the Odontological Society of Great Britain.

quent discussion, of maturer experience and of more recent literature, I am almost ashamed to admit that I have nothing to retract or withdraw, but am justified and corroborated in the position I advanced. I am, of course, in no way responsible for erroneous or misapprehended rendering of that position and, with your permission, I will briefly recite what it was.

I approached the consideration of associated and related ocular and dental diseases under two categories : (1) Those due to direct pathological sequence, of which antral abscess from dental caries and necrosis of the orbital plate with orbital cellulitis might be taken as a type, and (2) those due to indirect pathological sequence, almost necessarily nervous in mechanism, of which certain spasmodic affections of muscles of the eye might be regarded as typical. And my conclusion was thus stated :—"I am aware that while some regard all oculo-dental disorders with a wholesome scepticism, others are apt to concede to them an undue importance. I have attempted to decide justly between such extremes ; I am led to emphasize the importance of orbital and ocular troubles with direct pathological relation to dental diseases ; to relegate to a less proven category reflex amaurosis and the like, while recognising the undoubted existence of certain reflex spasms and radiated neuralgiæ, which oculists must look to dentists to explain and cure."

Since I wrote this I have been busy four days a week for nearly four years, seeing ophthalmic patients in hospital together with private practice ; I need hardly say I have kept my eyes open for reflex amauroses and reflex ocular paralyses, which should stand minute investigation. I have also looked out for such cases in medical literature, I have searched the volumes of the Ophthalmological Society, I have glanced through your own *Transactions*, and am forced to conclude that the position I maintained in 1891 still holds the field. I came across an interesting paper read by Dr.

Maughan, before your Society, in February, 1893, and feel bound to allude to the facts he brought forward, so far as they touch the matter in hand ; more especially as I find that my paper of 1891 was alluded to by those who engaged in the subsequent debate. Dr. Maughan's paper was on " Remote Pain in Dental Disease," and he appears to cite two cases--and only two--of his own, both of which trench upon the question of reflex ocular effects arising from dental cause. Here are the cases verbatim :

(1) " A patient complained of blurred vision in the right eye, and said it had lasted for upwards of twelve years. On examination the pupil was found dilated and irresponsive to light, thus indicating paralysis, temporary or permanent, of a few fibrils of the third nerve. On looking into the mouth a right upper molar was discovered carious ; this was extracted, and three weeks later the pupil was normal, and the sight perfect."

(2) " A woman, aged 45, slightly presbyopic in both eyes, came to the National Dental Hospital complaining of impaired vision of the right eye, and a painful first right upper bicuspid. On closer questioning, I found that her trouble was suddenly increased presbyopia in the right eye, and that if she closed her left, she could not accommodate her vision at all for near objects."

The offending tooth was removed, and the accommodation restored equal to the left. I gather that Dr. Maughan explains this case by the suggestion that the patient's centre for accommodation was getting tired out, and dental irritation further inhibited the flagging centre.

In the discussion which followed, Mr. Hunt regretted that I was not present (a regret I cordially share), as my arguments on a previous occasion " were not very convincing to him," though he kindly observed that my contribution was " valuable in that it made them look round for the ground of

their faith, but remote pain in dental disease so frequently occurred, they must be cause and effect." Mr. Hunt, I must here remark, was tilting at a windmill which I had never attempted to set up ; I recognised, nay, insisted upon, the "undoubted existence of certain reflex spasms and radiated neuralgiæ." Reflex amauroses and reflex ocular paralyses were the cases relegated to a less proven category, and for which I asked for unambiguous evidence. Though not present myself, in Mr. Albert I appear to have had a doughty champion, and I tender to him my grateful thanks. He was one of the unfortunate ones, he said, "who agreed with Dr. Collins." I would, however, bid him be of good cheer, as I have yet to learn that the position in which we agree has been seriously assailed. Do Dr. Maughan's two cases contradict my thesis ? Although in the first case "blurred vision" was present for twelve years, and cured in three weeks by tooth extraction, I do not gather Dr. Maughan regards the case as one of reflex amaurosis, for in his reply he said : "In connection with oculo-dental symptoms, he had paid a good deal of attention to one line of enquiry, viz., whether failure of sight could be traced to dental irritation ; but hitherto he had never been able to obtain affirmative evidence."

With a view to clear up the nature of these two cases, I wrote to Dr. Maughan asking him if he could oblige me with the notes of the cases, or any further particulars. He replied he was sorry to say he had no notes of the patients referred to ; he added he had searched in suggestive cases again and again for ophthalmoscopic changes, but hitherto with no success, and in a P.S. he added : "Since Feb. 1 1893, I fancy my ideas have been very much modified on this subject." I will only remark that the pathology of presbyopia put forward by Dr. Maughan in connection with the second case, viz., failure of the centre, is not that which has been generally received from Donders downwards and which refers

the change to alterations in the shape and consistence of the lens, and numerous difficulties occur to me as precluding a reflex cycloplegia as the most probable explanation of either of Dr. Maughan's cases.

On the other hand, cases which are undeniable continue to accumulate, which establish the great importance of orbito-maxillary diseases, of cases where abnormal or diseased condition of the upper jaw affect the orbital contents, and in some rarer instances in which the reverse order of events obtains. The anatomy of the parts concerned is of course always to be borne in mind ; seven bones form one orbit and eleven bones form the two, owing to the contribution to each afforded by the frontal, ethmoid and sphenoid. Next to the frontal the superior maxilla exposes the largest surface to the orbit ; its orbital plate grooved by the infra-orbital branch of the superior maxillary nerve may be regarded as the plane of demarcation between the ophthalmic and the dental specialist. Pathology, however, pays little regard to the limits of specialism. The plate is of no great thickness, but is rarely fractured, though its perforation in paracentesis of the antrum is not unknown. Permanent infra-orbital anæsthesia may result from fracture of the upper jaw, or operations upon it. I have notes of a case of acute neuralgic pain referred to the region over the upper jaw, though the skin was anæsthetic, and I stretched the nerve with beneficial result. Only three weeks ago I had a case of herpes zoster affecting the area of distribution of the nasal, labial and palpebral terminal branches of the left superior maxillary nerve, and also the supra-orbital of the same side ; there was coincident increase of tension in the eye and vision was reduced to J. 8. with correcting glasses ; eserine drops were used for the eye and poppy fomentation to the face, and the vision is now J. 1, the tension normal and the herpes has disappeared. In August of this year a woman, aged 40, was admitted under my care, with swelling in the

region of the right upper jaw, encroaching on the right nostril and right lower eyelid ; it was elastic and evidently superficial to the bone, and was attributed by the patient to an attempt at removal of some upper stumps, by a chemist, some two years previously ; puncture gave exit to brown mucus, but in a few weeks there was reaccumulation, and under an anæsthetic the walls of the cyst were cut away, the site scraped and plugged with gauze and the stumps extracted—the result was satisfactory.

The nasal duct which establishes a nexus between the conjunctival sac and the inferior meatus of the nose and the major portion of whose bony wall is formed by the superior maxilla, gives rise to a class of disease requiring special care and treatment. Dacryocystitis and epiphora vary greatly in their amenability to probing and the use of styles ; where there is bare or carious bone felt by the lacrimal probe it is doubtful policy to persist in its continued use.

The next class of cases requiring consideration are those arising from periostitis of the upper jaw : I have notes of a case of a child of 6, in whom there was proptosis of the globe and much redness of the lower eyelid ascribed to an attack of erysipelas, and incision let out an ounce of offensive pus ; it appeared to be unconnected with either the lachrymal sac or the teeth, and may have been a so-called “ residual ” abscess or more probably acute periostitis of the maxilla. Salter long ago called attention to necrosis of the alveolar process following the exanthemata in children, but the same cause may also lead to necrosis of the margin of the orbital plate of the maxilla or orbital margin of the malar bone. Such cases are not very rare in ophthalmic *cliniques*, and I have several times had to perform plastic operations for the cure of the ectropion of the lower lid which results from its cicatricial adhesion to the bone. The scar requires to be freely divided, and after removal of a semi-lunar piece of the palpebral conjunctiva the

lower and upper lids should be refreshed and sutured together for a portion of their ciliary margins, to be again released when likelihood of retraction is over. In more severe cases it is necessary to remove a V-shaped portion of the lower eyelid.

According to some German figures, phosphorus necrosis would appear to be only slightly less common in the upper than in the lower jaw ; it rarely, however, extends beyond the alveolus. Repair after necrosis is apparently less complete in the upper maxilla than in the mandible ; its occurrence was doubted by Trélat and Stanley, but Ollier has recorded cases, and Heath relates one in which little deformity resulted after complete exanthematic necrosis of the bone, although in this case it would seem repair was largely of a fibrous character.

In the antrum and its diseases we have the *pièce de résistance* of orbito-maxillary diseases. I need not dwell upon its anatomy—the small and high placed orifice by which its contents drain into the middle meatus, the often loculated condition of its floor, the occasional intrusion of the dental fangs from the canine to the wisdom—and the consequential potentialities of disease thereby occasioned. The name of Nathaniel Highmore has, in English, and also in some continental works, been associated with the antrum, but it was certainly described, figured and named before his time. Highmore was born in 1613, was at Oxford when Harvey came thither with the king after Edgehill, and died at Sherborne in 1651. His “*Disquisitio Anatomica*” was published at the Hague, and dedicated to Harvey ; on page 226 he describes the antrum, and on page 227 there is a rough sketch of it. Nevertheless, Julio Casserio, whose name is immortalised by and identified with the ganglion of the 5th, who died in Padua in 1605, eight years before Highmore was born, had already in his magnificent volume on the five senses published in an *édition de luxe* at Venice, far more

faithfully delineated and as accurately described the maxillary sinus.

Electric illumination of the antrum from the mouth has no doubt given us a means of detecting the presence of morbid contents of the sinus in a stage earlier to that in which its walls are expanded. Hydrops, empyema, non-malignant polypi, which are more common than Paget originally thought, and perhaps dentigerous cysts, too, may occasion elevation of the antral roof and encroachment on the orbit. Hunter, who paid special attention to abscess of the antrum and its evacuation through the socket of an extracted molar, observed that the eye might be sometimes "affected," but he did not specify in what way. I believe it is by the inflammatory or necrotic process, either started in the maxilla by a periodontitis or accompanying acute antral abscess, spreading by contiguity to the orbital periosteum or cellular tissue, that orbital and ocular symptoms supervene. When the vision is thus affected the lesion may be erroneously set down as reflex amaurosis, as notably in the case which Sir W. Lawrence and Mackenzie quote from Galenzowski, and which has been spoken of as the most brilliant case of the kind on record; yet in this case there was a repeated discharge of pus in the neighbourhood of the lower eyelid. Such another is that of Pasquier, where fracture of the alveolus in extraction of a right first upper molar was followed by necrosis, orbital pain, tumefaction of eyelids, amaurosis and dilated pupil—then there occurred abundant, thick, greenish, puriform, foetid discharge from the right nostril, and the vision returned in eighteen days. In these cases I submit the pressure and traction of inflammatory products on the optic nerve occasion temporary amaurosis, and the extension of inflammation to the nerve itself may occasion permanent amaurosis, just as is seen in cases of cellulitis arising within the orbit. Salter, in Holmes' "System of Surgery," quotes three cases of the kind, one observed by

himself, in which the floor of the orbit sequestered, one by Brück, in 1851, and one by Pollock, in which amaurosis occurred from extension of inflammation round the maxilla from a carious molar but without antral abscess. Gaine has reported a case where loss of vision associated with antral abscess from a carious tooth, on ophthalmoscopic examination showed anæmia of the optic nerve. I have notes of a case where syphilitic nodes within the orbit along with necrosis of the maxilla, exhibited neuro-retinitis, terminating in white atrophy. Snell, in vol. x. of the *Ophthalmological Transactions*, relates the case of a young lady, aged 14, who had fatal orbital cellulitis following extraction of teeth, around which necrosis had commenced. He narrates two other cases, one in a boy aged 8, where the extraction of a right upper molar was followed by suppuration, orbital cellulitis with proptosis and atrophy of the optic nerve, reducing vision to mere perception of light. The other case was that of a girl, aged 15, in which a disfiguring ectropion resulted from a sinus due to necrosis started by the fracture of a central incisor.

Heath quotes from White Cooper what he calls a unique case of "falling in of the antrum" with epiphora. It seems to me, however, to be similar to, if not identical with, the rare though well-recognised *Hemi-atrophia facialis*, an account of two cases of which, with excellent photographs, will be found in the volume of *St. Bartholomew's Hospital Reports* for 1882; in both vision was interfered with by corneal changes, and the upper jaw had fallen in.

Non-malignant tumours of the upper jaw may invade the orbit and damage its contents, such as the so-called fibromata described by Lister and Paget; one of the latter's cases exhibited pulsation of the orbital portion. These are now relegated to the sarcomata, but Heath thinks on "insufficient grounds." There are also enchondromata and osteomata,

including the leontiasis of Virchow, which may obliterate the antra and close the orbits as in Howslip's well-known case.

During the last two years three cases of sarcoma of the orbito-maxillary region have come under my care, for all of which I performed operations. The first was that of a man, aged 48, admitted to the Royal Eye Hospital, Southwark, on March 10, 1893. For three months previous to admission he had had left supra-orbital pain, increased by looking to the left, and for three weeks there had been swelling, rapidly increasing in the region of the nasal process of the left superior maxilla, with redness of the eye and epiphora. On examination there were proptosis and outward deviation of the globe, occasioned by a swelling, about one inch in its longest diameter, fixed, semi-elastic, and non-fluctuating; on digital examination of the orbital margin a further swelling was detected above the inner canthus; the conjunctiva was thrown into prominent infiltrated rugæ. There was epiphora, but no nasal tumour nor palatal or faucial implication. The temperature was normal, and there was no syphilitic history nor malignant inheritance, but he had lost flesh latterly. The vision of the right eye was normal, and of the left = $\frac{6}{12}$ and with + 2.50D. J1. I determined to clean out the orbit, and explained to the patient the eye would have to be sacrificed. On March 14, A.C.E. mixture was administered by Mr. Cargill. I made an exploratory incision into the larger mass, which sufficiently revealed its sarcomatous nature. I then excised the eye and cleared out every particle of soft tissue in the orbit. The tumour appeared to grow from the periosteum near the commencement of the nasal duct. With a stout elevator I scraped the periosteum from the orbital walls, and finally applied Zn-Cl.² and opium paste on strips of lint. It is generally idle to attempt to save the eyelids in such cases; they may be infiltrated, and it would be foolish to sacrifice free removal to

cosmetic effect, and even if successfully saved from the escharotic effects of the paste, they will be so drawn in by subsequent cicatrisation as to be unrecognisable. He made a rapid recovery, and the necrosed bones of the orbit came away in the course of two or three weeks ; his weight went up, and when last seen two months ago there was not the slightest evidence of local glandular or remote return. The microscopic examination showed it to be a round-celled sarcoma, probably periosteal in origin, though some arise, according to Virchow, from the connective tissue of the orbit. Supra-orbital and infra-orbital anæsthesia ensue in cases where the orbit has been thus evacuated, owing to destruction of the first and second divisions of the fifth.

The next case of the kind came to me at the London Temperance Hospital, in August, 1893. Phœbe S., aged 15, had been treated in May of that year at another hospital for "a tumour of the eye," which had, it was said, disappeared. The floor of the right orbit was found on admission to be occupied by a hard mass extending to the malar bone ; the eye was pushed upwards and proptosed, causing diplopia ; she was unable to close the lids, and the ocular conjunctiva was in a condition of gelatinous œdema. Vision was nearly perfect. The same method of operation was adopted in her case, and she made good recovery. Within two months, however, some suspicious growth was observed at the most posterior part of the orbit, Zn. Cl.₂ paste was reapplied, but there was again return, evidently extensive and beyond reach. I heard of the patient's death in June, 1894. Probably here, as elsewhere, sarcoma in the earlier years of life is more certain and rapid in its recurrence than at later ages. I have by me the notes of a case of sarcoma involving the hard and soft palate, and spreading past the fauces to the base of the skull, in a child aged 2½ years only ; in her case the first symptom was observed only two weeks before admission : and though tracheotomy prevented

suffocation for a while, the growth was so rapid that in eighteen days the child died.

The last and by far the most interesting case with which I shall trouble you, is William W., who has been on and off under my care at the London Temperance Hospital during this year. He was 42 years of age, and was sent to me on Jan. 30 with a letter from Dr. C. L. Lightfoot, of Newcastle, stating that six weeks previously a small tumour had been removed from the lower margin of the left orbit, and also some "polypi" from the left nostril. Microscopically these proved to be sarcomatous, and recurrence *in loco* had already taken place. An unfavourable prognosis had been given, and a more extensive operation was suggested as the only hope. The patient stated that he had had ague and rheumatic fever and jaundice; the "polypi" had troubled him since June, 1893; there were sharp shooting pain in the orbit, a discharge from the left nostril, and an unpleasant taste in the mouth. He had lost flesh rapidly. He was admitted into the London Temperance Hospital on Feb. 3, 1894, and this photograph exhibits the condition of the parts as then seen. The left eye was normal, but diverted, and there was diplopia when the lids were separated; the skin over the swelling was red, adherent, and evidently involved. The left nostril was blocked by a fleshy growth, and the septum deviated to the right. He snored at night. The roof of the mouth appeared to be healthy, but the finger encountered growth in the left posterior nares. There was no obvious glandular enlargement; the urine and organs were healthy. The man looked cachectic, and weighed only 8st. 4lb. On Feb. 7 chloroform was administered by Dr. Wilde. Dividing the upper lip to the left of the middle line and opening the nose, I found the greater part of the superior maxillary bone soft and friable; the antrum contained soft growth, and the nose, ethmoidal and sphenoidal cells, and orbit were invaded. The orbit was

cleared out, also the antrum down to the palate, which appeared healthy ; the whole of the bones of the left side of the nose and inner wall of the orbit, as also the vomer and septum, had to be sacrificed. No soft parts were left between the roof of the orbit and the hard palate ; the ethmoidal and sphenoidal and frontal sinuses were scraped out with a sharp spoon ; all the implicated skin was cut away, the lip was united by a harelip pin and sutures, and chloride of zinc and opium paste on strips of lint, was packed against the exposed bones. The hæmorrhage was free but not very troublesome, as I plugged the posterior nares with lint and hung the head well over the end of the table. On Feb. 8 the patient had had very little pain. He had slept for eight hours. He was taking food well through a tube. On the 9th the pin was removed. Movements of the soft palate and the Eustachian orifices were seen on looking into the orbit. On the 17th the temperature was normal, there was no pain, and the sloughs were separating. On the 23rd he was gaining weight at the rate of about one pound a day. On March 2, one or two suspicious places in the neighbourhood of the ethmoid had been touched with chloride of zinc paste. On the 8th the patient was discharged. The microscopic examination showed round and spindle-celled sarcoma. On April 20 he was re-admitted, owing to some more suspicious spots having appeared and some enlarged glands having presented themselves in the superior carotid triangle. The paste was applied to some growth springing from the infundibulum. On May 3 a small packet of three or four infected glands was dissected out of the neck under chloroform. On the 6th the wound had healed.

With the assistance of Messrs. Arnold & Sons I designed a silver plate, with a glass eye let into it, and secured by a pair of tinted spectacles ; the cosmetic effect was satisfactory. On Aug. 7 the patient presented himself for inspection, looking

robust and well, and showing no sign of recurrence anywhere ; he had lost the cachectic tint he previously had, and had gained 5lb., his weight then being 9st. 6lb.

In October, however, he was again sent up to me, and I found a suspicious spot just inside the left nostril, which I scraped out with a sharp spoon and applied paste to the raw surface left. I also found two more enlarged cervical glands which I excised, and I am glad to be able to report that an inquiry sent to Newcastle last week elicited the reply that he was quite free from any further local or glandular recurrence and was gaining in weight.

These, gentlemen, are the cases I have presumed to bring to your notice in response to your Secretary's invitation. I apologise for the fragmentary character of my paper by pleading the lack of any consecutive leisure. I fear, in trying to be less iconoclastic than in my last endeavour, I have succeeded in being intolerably dull. I throw myself on your indulgence, and await your kindly and candid criticism.

DENTAL MECHANICS.

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Continued from page 67.

Plate punches (Figs. 10, 11, 12, 13), are used for chasing the plate round the necks of teeth, or into the depressions of deep rugæ.

The handles of broken pliers or nippers, when properly shaped-up make excellent punches for this purpose. They

have, of course, to be softened, bent straight, and then tempered. The points should be made to correspond to those shown in the figures.



Fig. 10.



Fig. 11.



Fig. 12.



Fig. 13.

Larger brass punches are useful to stamp buckles out of plates, and to punch the plate into deep concavities. (Fig. 14).

The Plate-elevator is an instrument used for removing metal plates from the lead counter during the operation of swaging. It can be readily made out of a suitable piece of steel wire, or by softening and filing up an old six-inch rat-tail file.

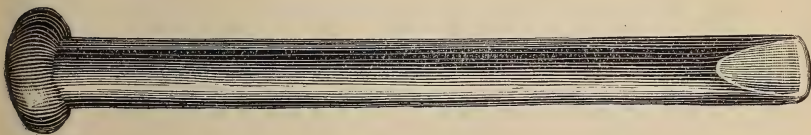


Fig. 14.

The end can be given the required curves (see Fig. 15), by bending it when red hot over a thick round rod of iron or steel. The point of the instrument is flattened somewhat on its upper aspect, and at the extreme point a slight notch is made to prevent it from slipping away from the plate, when the latter is being prized or lifted out. It should be hardened and then tempered to a blue colour. A handle can afterwards be fixed to the part that corresponds to the tang of the file.

A double-ended brass modeller, (see Fig. 16) is a most useful little tool. It is principally used for moulding up pattern lead, to make the pattern for the plate. It should be about half an inch longer than the illustration.

Common penknife—used for many purposes, such as cutting wax, trimming up models, etc.

Bite frames, for description of which see chapter on bites.

Draw-plate. This is made of steel about three inches long, by one and a half inches wide, and one quarter of an inch thick. It is perforated by a number of holes, ranging say from one to twenty. The holes are enlarged at the back of the plate and tapered up to their proper size as they emerge from the front of the plate.

The price of these plates varies according to the number of holes and the maker.



Fig. 15.

To draw gold or other metal into wire, it is necessary to take the ingot of metal and roll it in the flattening mills or rollers, until it is reduced in thickness, this should not be more than a fifth thicker than the wire required. It should then be annealed, viz., made red hot; this is to soften it. It is now ready to cut into strips, these should be cut the same way as the gold was rolled, and the strips should be as nearly square as possible.

The strips of gold are then annealed again and bent quite straight. The end of each should be pointed and the sharp edges taken off with a file.

The draw-plate should be securely fixed in the vice with the front towards one.

The pointed end of the strip of metal is now passed into the back of the largest hole in the plate, and is drawn forwards through the front by means of a pair of large pliers or draw tongs, (according to the size of the wire).

After the strip has been tightly drawn through three or four holes, it should be annealed again, and so on until the right guage is reached.

In drawing wire, one has to take a firm grip of the pointed end of the strip of plate with the draw tongs, and then throw the whole weight of the body backwards at the



Fig. 16.

same time as the pull takes place. To do this safely it is very necessary to firmly secure the draw plate in the vice, for should it come away one might fall on one's back, or the plate strike one in the face.

The draw-plate after use should be wrapped up in a piece of greased brown paper, and kept in a dry place.

The guage-plate is to ascertain the thickness of plate, and the numbers range from about four to nine. No. 4 is the thinnest and 9 the thickest. No. 7, 8, or 9 are the ordinary thicknesses for dental plates, and these plates are in many instances further strengthened by No. 5 and 6. For a bar lower plate No. 8 strengthened by No. 7 makes a strong plate and admits of the edge being nicely rounded, and strength given to the pins of tube teeth. The Messrs. Ash supply a set of brass standards of the different thicknesses of plate, which are most useful as a guide.

The Vulcanizer (Fig. 17). The one great element to con-

sider in a vulcanizer is that of safety, and for this reason one with the boiler made of gun metal is to be preferred to one made of cast iron. Another feature is that it shall be easy of adjustment, and there is no question but that the arm with

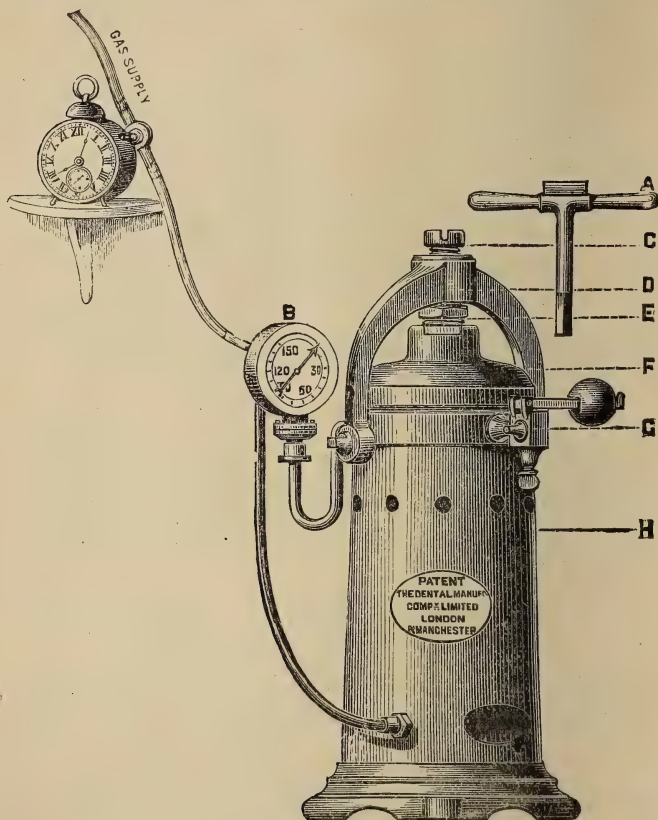


Fig. 17.

centre screw presents the simplest and most effective form for fastening on the lid. If the edge of the lid is turned so as to fit into a corresponding groove on the rim of the boiler, a very effective and lasting steam joint can be made by filling the groove with lead; this does away entirely with the old

rubber washers, which were always a source of trouble and annoyance, and constantly getting out of order when subjected to the not always gentle treatment they experienced in the laboratory.

Another essential is that the vulcanizer should be supplied with a pressure-gauge and gas-regulator ; this is a great element of safety, especially in the workroom where pupils or young people are employed.

An even temperature is maintained, no matter how long the vulcanizer is left, and this is more conducive to producing a tough strong case, than when the temperature is constantly fluctuating as it would be if the boiler was not supplied with a gas-regulator.

The vulcanizer should be supplied with a Bunsen burner for heating, and each time the boiler is used it should be cleaned out. A fusible plug in the lid of the vulcanizer further minimises any risk of an accident.

Vulcanizers combining these essentials and elements of safety can be obtained at the principal dental depots, and the advice the writer would give to the young dentist about to purchase one, is to get the very best that can be bought.

Flasks are made of gun metal or iron ; those of the first named metal are the best, they are cleanest to work with, and do not rust.

For all practical purposes a flask divided into two sections and a lid is all that is necessary. The flasks should be cleaned from plaster after using, and the edges between kept perfect. Perfect closure of the two halves of the flask indicates that the bite is not raised in edentulous cases.

It is a very common, but reprehensible practice to hammer the edges of the flask for the purpose of removing the plaster after using ; such should not on any account be done, a stiff-bladed narrow knife should be used to cut deeply into the plaster around the circumference of the flask, the point of

the knife being directed to the side. If this is done on each side of section, the plaster and case are easily pushed out without any force.

A clamp for preventing the bite from being raised either in partial or edentulous cases is shewn in the section on vulcanite work, and the manner of using it described.

^{over} The clamp is made in the following manner :—Take a strip of brass plate, No. 9 gauge, about four inches long, by two inches wide. Now draw lines half an inch from the upper and lower borders. The brass plate is now placed in the vice, just allowing the half inch line to be seen, this is then bent at right angles. The brass is then reversed and the other border served in the same way. Sections are now cut from the bent portion, to enable the clamp to be bent so as to conform to the shape of a model. These clamps may be made in several sizes so as to accommodate different sizes of models.

This form of clamp was devised by the writer's father, and has been in use over twenty years. It effectually prevents any raising of the bite, and presents the case in a most convenient form for packing in the rubber. In cases where there is a difficulty in introducing the rubber, such as presented by a case in which the teeth fit pretty closely on the model, and there is a considerable substance of rubber along the outside of the alveolar border, it is the best plan to remove the teeth, and pack the part that is difficult of access, then replace the teeth and finish the process.

A Press for squeezing flasks together after packing in the rubber, will be found a useful adjunct to the plaster bench. It will save the vice from being used for this purpose.

Bunsen burners, for waxing up cases, for boiling water, heating-up plate-work prior to soldering, and other purposes, may be seen in great variety in any dental catalogue. For modelling-up a case in wax, the burner should give a blue

flame, about the size of that produced by a spirit lamp, while the Bunsen for heating purposes, is brought to great perfection by Mr. Fletcher of Warrington, giving an intense heat without smoke.

The Steam Swager. This has been described and illustrated in the section on Vulcanite Work. It is a most valuable adjunct to the dental laboratory, as it enables the dentist to realize an ideal in the making of rubber dentures, that before its introduction was simply impossible. By its use a perfect contour plate can be produced of any thickness, perfectly copying the depressions and elevations of the palate, at the same time the surface is brought out polished.

Wire Clamps for holding strengtheners in position on a gold plate, are made out of soft iron wire in the following manner:—Cut the wire into two inch lengths, flatten half an inch at each end, then bend the centre portion into a circle as near as possible, and make the two flattened ends, approximate to each other along their whole length. A stock of these clamps can be made in half an hour, from different thicknesses of wire, and will be found useful for many purposes.

The Grindstone should be from a foot to eighteen inches in diameter, and fixed on a suitable iron stand, forming the trough in which the stone runs, and containing the water to moisten it. The most convenient form of grindstone is one to which a treadle is attached so that it can be worked by the foot. A great deal of time is saved in sharpening tools by having a good sized stone. Besides sharpening tools, it is also very useful, in reducing into shape old files to make scrapers for vulcanite work. This can be done without in any degree reducing the temper of the metal. First-rate scrapers can be made in this way, the file being finely tempered and of the best quality of steel.

The attention of the reader is now drawn to the tools

and appliances that are absolutely necessary if the young dentist desires to go abroad, and then has to depend upon his own skill, ability and ingenuity, to supply himself with materials, etc., that he would otherwise have to send to a dépôt for.

In such a case he will have to provide himself with a pair of flattening mills for rolling gold, iron ingots of various sizes to pour gold into when melted, crucibles for melting, and tongs for placing them in and withdrawing from the fire.

A pair of extra large shears for cutting plate thick enough for wire, and a draw-bench, a large pair of draw-tongs, and large pliers for pulling wire.

A complete set of carpenter's tools will also be found a useful addition to his *répertoire*.

He should also provide himself with the means of making springs, and lay in a stock of steel wire of various degrees of thickness, also cast steel plate that he may not be at a loss for various little tools, that he should have been taught to make during his apprenticeship.

Now, as it is part of a dentist's education to understand the use of the tools named, so also it is essential that in the event of accidents happening, he should be able either to repair or renew the same. To attempt this the dentist should know how to forge, file, harden and temper steel.

To make an instrument, the steel unless already soft, should first of all be made red-hot on a block of charcoal, and allowed to cool very slowly. This treatment makes it quite soft, and enables one to file it readily.

If it be necessary to flatten or forge it to any desired shape, it should be placed in a fire, preferably one of charcoal, and brought up to a red heat, and while in that condition, should be hammered, bent or flattened, according to the desired pattern.

If all the forging can be done during the first heating, it is better, as less carbon is taken out of the steel, but on no account must it be hammered when cold, that is to say when the redness has gone. It should now be allowed to cool slowly, avoiding contact with any cold surface, as it is likely to harden it somewhat.

The after treatment of the forged metal, is to file it into its proper shape, then with a fine file to produce a smooth and finished surface free from cuts or scratches. It should now be smeared over with soap and made red-hot again, and then suddenly plunged into cold water or oil. It is now so hard that a file would not make any impression on it, and also so brittle that great care has to be taken, that it does not get broken.

The object of rubbing soap on it prior to making it red hot, is that the soap prevents the surface of the steel from oxidising or scaling.

The instrument, or at least that part of it that requires tempering, should now have the surface cleaned sufficiently to enable one to see the colour of the steel, while changing under the influence of heat. Small things may be tempered by holding them over the flame of a Bunsen burner or spirit lamp, or if the article to be tempered is thin, like a spring, or clamp for instance, it may be tempered by placing it on a piece of iron, made nearly red hot, this will bring out the colour gradually and evenly.

When the colour is discernable the instrument should be immediately dipped into cold water or oil.

The following formula for tempering steel is taken from Fletcher's Dental Metallurgy :—

	Fahrenheit	Centigrade
Light straw-colour	430°	221.
Dark straw-colour	470°	243°

The above for wood, ivory, and vulcanite tools.

	Fahrenheit	Centigrade
Brown-yellow	500°	260°
For gravers, and tools for metal cutting.		
Bright blue	550°	288°

For springs and saws.

It is the best plan to heat first the part of the instrument that does not require any accurate temper, such as the handle or part furthest away from the cutting edge. When this has been reduced to a blue, the other part of the instrument is passed to and fro in the flame, taking notice at the same time that the thinner portion of the instrument should be the last to apply the heat to.

After tempering, the instrument may be polished by rubbing the surface with corundum or carborundrum files or wheels, and finishing off with emery and oil.

For filing steel, or iron, or brass, suitable files should be used ; on no account should the files one uses for gold work be applied to this purpose.

For forging steel, one wants a strong beak iron, and a fairly heavy hammer. It is not supposed that one would attempt anything very large, as such would require a beak-iron and hammer, heavy in proportion.

(To be continued.)

At present the total exportation of copal gum, both fossil and from the living trees which are to be found in abundance in the Upper Congo, is insignificant compared with the yield—averaging 8,000 tons a year—of New Zealand Kauri gum, and of the excellent varnish-resins obtained in the Dutch-Indian colonies and brought to market in Amsterdam and Rotterdam ; but in the course of time Antwerp is likely to run London and Liverpool pretty close as a centre of importation of this important commodity.

Chemist and Druggist.

British Journal of Dental Science.

LONDON, FEBRUARY 1st, 1895.

PROPOSED AMENDMENT OF THE MEDICAL ACTS.

THE British Medical Association has a Parliamentary Bill Committee which no doubt does useful work. At its last meeting, the Clauses of a Draft Bill were considered, dealing with a question of which we shall be hearing a good deal before long. As we have before pointed out, the Dentists' Act of 1878 is really in some respects a stronger one than the Medical one of 1886. Much dissatisfaction has of late years been expressed with the want of stringency in the latter, especially in regard to the assumption of certain titles by unqualified persons. It has always been a matter of difficulty to obtain the sanction of Parliament for the absolute restriction of the Healing Art to qualified practitioners. Whether the times are altered sufficiently, remains to be seen. The unsuccessful prosecution of certain Indian oculists not long ago, and other cases, may have opened adverse legislator's eyes to the fact that it is necessary to increase the protection of the Public ; but unless the Public itself proves to be less apathetic than formerly, we cannot expect opposing parties in the House of Commons to abandon their attacks on each other for such an ordinary, common-sense, business as an Amendment of the Medical Acts.

Three Barristers respectively drew up clauses for the suggested Amendment, and, as they seemed to approach unanimity, the Parliamentary Bill Committee, mentioned above, thought it best to make it absolute, and therefore arranged for the legal gentlemen to consult together. The result of their deliberation, signed by all three, is now before the Profession, and the various Branches of the Association are requested to consider and comment upon

the Draft Bill without delay. It seems to us that Dentists are, and should be, distinctly interested in this matter, and those who are on the Register, and who are anxious to see some flourishing abuses checked, will no doubt expect that the leaders of our Profession, who have done so much in the past, will continue to watch the interests of Dentistry.

It is, of course, possible, or, indeed, probable that several changes may be made in the Draft Bill; nevertheless we may, perhaps, take the opportunity of alluding to some of the Clauses. In the first, we do not find the words "Dentist" or "Dental Surgeon" amongst the other titles forbidden to be used by unqualified persons, but these are already covered by the Dentists' Act. There is, however, provision made to prohibit the use of any description which directly or indirectly implies the possession of skill necessary for the practice of medicine, surgery, midwifery, or any branch of medicine or surgery. Now some may contend that Dental Surgery is a branch of General Surgery, and if this is distinctly understood, some benefit may result; but in the face of Clause 5, some more explicit announcement seems to be desirable. There we read that in any prosecution under this Act, it shall be sufficient *prima facie* evidence that a person is not duly qualified that his name does not appear in the *Medical Register* for the current year. Indeed it seems to us that if it were not for Clause 7, (which provides that nothing in the proposed Bill shall be construed as affecting the operations of the Dentists' Act) qualified dentists might possibly be open to the charge of improperly practising a "branch of Surgery." Even as it stands, it might possibly be contended that Clause 7 implies that no additional benefits are intended to be conferred upon Dentists. Again, Clause 2 says that a person is not duly qualified within the meaning of this Act unless he is (a) registered under the Medical Acts or (b) possessed of the diploma of one of the Medical Corporations mentioned in the Medical Acts entitling him to practise medicine or surgery. Nothing is said about "a branch of Surgery," or a diploma in Dental Surgery. Under all the circumstances it will appear clear to Dentists, whether in favour of the Act or the

reverse, that the point must be further elucidated. We believe that many would be anxious to share in the benefits resulting from Clause 3, part of which is so important as to deserve quotation :—" A person shall be deemed to take and use a title, name, style or description who advertises, exhibits or holds out, or is party to the advertisement, exhibition, or holding out of any title, name or description of or concerning *any institution, company, association, body, place or premises* whereby it is directly expressed or implied that medicine or surgery *or any branch of medicine or surgery* is practised there, or who carries on, or is a party to the carrying on, by or at any such institution, or under or in connection with such institution, company, association, body, place, or premises the practice of medicine, surgery, or any branch of medicine or surgery." The italics are ours, and emphasize the expressions which are of the utmost importance to Dentists.

THE METRIC SYSTEM.—It must be supposed that our Government Authorities have still some good reason for looking with disfavour upon the adoption of the metric system of weights and measures in this country. Apart from its scientific aspect, the want of a unanimous international method is a trouble in commercial circles, especially to the minority. We understand a Bill has been drafted to amend existing laws, so that the export traders may be at least permitted to use the French weights and measures. One of the largest wholesale drug houses in the City has been in the habit of executing foreign orders by weighing and dispatching in kilos ; a London County Council inspector has, however, recently called and cautioned the firm against continuing such a practice. He is reported to have said that they might, if they wished, place upon the scales the equivalents of the kilo in British weights. It seems that this cannot be easily or satisfactorily done, and this instance seems to us a very good one to show the necessity for some alteration of the existing law.

DEATH UNDER NITROUS OXIDE.—The newspaper account of the inquest on this case of death under Nitrous Oxide gives the jury's verdict as "Asphyxia." There seem, however, to be some points in the evidence which would lead one to look in the direction of syncope rather than suffocation. The patient is said to have recovered consciousness, and pallor was the first symptom which attracted attention. Nitrite of Amyl and Ether were the remedies employed, and the medical man distinctly said that air entered the lungs freely. Tight lacing *plus* a weak heart appears to us a better explanation than suffocation.

Such fatal cases are fortunately extremely rare: but there probably occur cases of anxiety of which we hear little. We imagine that many women are, in private practice, allowed to keep corsets fastened which would be better loosened. The patient in this case could not have taken an overdose, for three and a half gallons of gas would scarcely suffice to paralyse the respiratory centre in thirty-five seconds, besides which artificial respiration would probably be effectual. We can only come to the conclusion that there was cardiac failure before artificial respiration was commenced.

SARCOMA OF THE PALATE TREATED BY TOXINS.—A case has been recorded in the New York *Medical Record* of a boy, aged 16 years, who was suffering from a spindle-celled sarcoma of the soft palate. The treatment consisted of injections of toxins obtained from cultures of the erysipelas micrococcus and bacillus prodigiosus. These were introduced into the arms and legs, and generally caused inflammatory symptoms for some hours. The treatment extended over some seven months, and the disease showed steady improvement, as evidenced by the gradual disappearance of the abnormal tissue. This apparently was removed by necrobiosis and by absorption. The disease had existed six weeks before the patient came under observation, and at the

end of a year the uvula and a portion of the epiglottis had been destroyed by ulceration, but all the affected parts had cicatrised. With exception of one or two ulcers on the palate the patient had practically recovered.

THE INSTITUTE OF DENTAL TECHNOLOGY.—Some of our readers have doubtless had an opportunity of reading the original scheme for the Technical Training of Dental Pupils. We understand that the necessary arrangements have now been completed, and that the premises taken at Langham Chambers are ready for the commencement of work. The Manual Training Room is under the management of a skilled mechanician, assisted by teachers for Modelling, Wood-carving, Repoussé and Artistic Metal Work, from the Guild and School of Handicraft. A Science Room is set apart for Physics, Chemistry, and Metallurgy, as related to Dentistry; whilst Moulding and Forge-work will be carried on in the basement. In connection with the Mechanical Laboratory is the Principal's Room with a technical Library and Museum.

NEW PUBLICATIONS.—A new departure in Medical literature has just appeared in the form of *Clinical Sketches*; it is edited by Mr. NOBLE SMITH, and will be published monthly. One of its principal features is to be the illustrations, and the first number contains an engraving of WILLIAM HARVEY, produced in facsimile from a well-known portrait. *The Dental Digest*, which we believe is to be edited by Dr. HARLAN who did so much for the *Dental Review*, comes to us from Chicago. It is described as the Official Organ of the Dental Protective Association of the United States. It is interesting to find that such an Association is necessary in other places than Great Britain, and we searched *The Digest* to find out more about it. Unfortunately pages 45-61 are missing in our copy, and we must be content to wait. What there is of it is good, and there are several illustrations to the various articles.

Abstracts of British & Foreign Journals.

WHITE WAX.

The prosecutions for the sale of adulterated white wax scarcely leave room for surprise. It has long been known that much of the white wax of commerce is adulterated to a greater or less extent with hard paraffin or with other substances, such as stearin and Japan wax; and no further back than the British Pharmaceutical Conference of 1893, Messrs. E. J. Parry and P. A. Estcourt reported on five specimens, only two of which were pure. It was admitted, in the course of the discussion, by gentlemen with knowledge of the wholesale trade, that admixtures of paraffin and beeswax exist, and are asked for by a particular name, or, as a very candid wholesaler explained, are sold under the market price of genuine beeswax.

The detection of paraffin-adulterated wax is a comparatively easy matter. The pharmacopœial tests are not adequate—indeed, the minimum specific gravity (0.950) admits sophistication, and it is safe to say that no natural white wax is obtainable so heavy as sp. gr. 0.970. Parry and Estcourt's genuine specimens were 0.962 and 0.963, and Dr. Friedrich Schmidt, chemist to Eugen Dieterich, seldom finds other than 0.961 as the specific gravity of pure white wax. Mr. Barnard S. Proctor, in his "Manual of Pharmaceutical Testing," remarks:—

"White wax is more commonly impure than yellow, but ought to stand the same tests. The commercial white wax in round cakes, as usually supplied by wax-chandlers, I have found to have a density of .939 and a melting-point of 103° F., congealing again at 128° F."

It is evident that the specific gravity is a matter of considerable importance, and it can be determined in Mr. Proctor's way,—*i.e.*, "Weigh 100 grs. of wax, stick a 5 gr. brass weight into it, and it should sink in water, but with a 3 gr. weight it should float." Dieterich's method is to allow drops of the melted wax to fall into a small basin of rectified spirit. Then make a dozen mixtures of spirit and water, each varying by a degree from 0.959 to 0.970 at 60° F., and put a wax drop into each, noting when it sinks. This is a very accurate method. Hard paraffin seldom exceeds sp. gr.

9·940, so that its presence in white wax is readily detected by its lowering the density. The melting-point is also distinctly influenced, and if this is found to be less than 142° F. the purity of the specimen may be suspected. The pharmacopœial method may be followed, or the bulb of a thermometer may be coated with the melted wax and put into water at 120° F., which is gradually heated further by adding boiling water, and using the thermometer as a stirrer. An approximate melting-point, sufficient for the purpose, is thus obtained. Schmidt always determines the acid, ester, and saponification equivalents, but these tests are too complicated for the dispensing counter. There is one test for paraffin which we have found most useful. It is as follows: Heat in a small porcelain basin about 2 drs. of concentrated sulphuric acid (but not boiling it), and on the surface drop about 30 grs. of the sample in shavings. Beeswax is immediately charred, and if there is paraffin present it gathers towards the edge of the dish, and on cooling solidifies to a violet-tinged mass, which can be extracted with chloroform. If the acid is boiled the paraffin is also charred, but this, on a little experiment, can easily be avoided.

The Chemist and Druggist.

SWALLOWING ARTIFICIAL TEETH.

By WILLIAM H. PEARSE, M.D.

A. L——, æt. twenty-three, a little lady, with very small mouth, during the night of October 25th, 1894, swallowed, in her sleep, her four front upper artificial teeth. I was called at 6 a.m. I could, by forcing the finger well down, feel the posterior edge of the vulcanite plate; the teeth were on the anterior surface of the gullet. I could also pass my finger over the right free edge of the plate. With the finger I made several determined efforts to dislodge the plate, but failed. I got hold of the free upper edge of the plate with a curved fore-and-aft-opening forceps, but they always slipped. I passed down a "money-clip" probang, but it did not

detach the plate. After so many efforts I thought it best to give her rest, and at noon Dr. T. Pearse gave her chloroform. We both made several efforts with fore-and-aft and laterally-opening forceps, but failed. I then passed down, posteriorly to the plate, a full size sponge probang, which, in smartly withdrawing, hitched firmly, and much force was needed to get it up, but without the plate. I again passed the same probang, and in withdrawing, much force was needed; the plate shot out on the patient's lap. The cause of the difficulty was then apparent. Projecting upwards at each end of the four teeth was a gold curved stay, one a third of an inch, the other a quarter of an inch in length, and both had sharpish points. These two hooks with their concavity upwards, must have fixed themselves, like two fish-hooks, in the anterior surface of the gullet. There was some bleeding, no doubt from the tearing out of the two hooks.

The patient was an eccentric, in that for several years she has semi-starved herself, with a view to make her figure slim. The only food she now took was toast water, to which some boracic acid was added, and a few grapes. I ordered boracic acid wash for the mouth, also 3 ij. tinc. quin. twice a day. She took also a little *café-au-lait*. She obstinately refused to take any other food or the quinine.

Oct. 27th: Temp. 101.8; pulse 122; slight swelling on the left side of the neck.

Oct. 28th: Temp. 103.2°; pulse 130, neck tender; no physical signs in chest or heart, much mucous expectoration from the pharynx.

Oct. 29th: Temp. 102.5°; pulse 126; swelling of the neck less.

Oct. 30th: Temp. 101.2°; pulse 108.

Oct. 31st: Temp. 100.9°; pulse 102.

Nov. 1st: Temp. 101.8; pulse 114. To-day, as she had defied everyone as to food, etc., I forced her to take six drachms of tinc. quin.

Nov. 2nd: Temp. 99.6°; pulse 96. I took a funnel with me to feed her with milk by the nostril; and as she knew I should carry out my threat if necessary, she took her *café-au-lait* better. She resolved to get up, and I ceased attendance.

The points of interest in relation to the accident are: (1) The danger of sleeping with artificial teeth in the mouth; this is not only a dangerous, but a very filthy practice. I find that dentists often advise their patients not to take out their teeth at night. (2) The old-fashioned sponge probang

was more effectual than the "money clip." (3) The very considerable force I had to use to dislodge the plate. (4) The happy freedom from œdema in a region so near the larynx.

Provincial Medical Journal.

A TEST FOR VASELINE.

Petroleum jellies are sometimes adulterated with a certain quantity of animal or vegetable fats. These can, of course, easily be detected by the process of saponification, but this is somewhat tedious. A simple test is the following:—Five drops of a saturated solution of potassium permanganate in distilled water are mixed in a mortar with 5 grammes of the jelly. If there is no foreign oil present the colour remains. If there is any vegetable or animal oil, the permanganate is reduced, and the colour changed to a dirty brown. A roughly quantitative determination can be made if the mass is gradually treated with solution of permanganate until the red colour is not discharged.

Union Pharmaceutique.

A MICROSCOPIC CLEARER.

Lenz recommends the use of a solution of sodium salicylate for clearing preparations for the microscope. This body has great advantages over chloral, as it very quickly transforms starch granules into a transparent jelly which is not disturbed by the addition of glycerine or water, and still turning blue with ionine. Further it has less detrimental effects on the ordinary tissues than chloral.

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary monthly meeting, December 3, 1894. Mr. Frederick Canton, M.R.C.S., L.R.C.P., L.S.A., L.D.S. President in the Chair.

The Minutes of the last meeting were read and confirmed.

The following gentlemen were balloted for and elected members of the Society:—Ashley Bloomfield Densham, L.R.C.P., M.R.C.S., L.D.S. Eng., 18, Stratford Place, W. (resident); George Thomson, L.D.S. Eng., 4, Park Place, Torquay (non-resident).

The following nominations were proposed to the Society for non-resident membership:—Ernest H. A. Mackley, L.D.S. Eng., 74, St. Giles Street, Norwich; Thomas L. Nash, L.D.S. Edin., 39, Church Street, Inverness; William Simms, L.D.S.I., 2, Bury New Road, Manchester.

The LIBRARIAN said he had only to report that the ordinary periodicals and journals had been received.

The CURATOR stated that he had received from Mr. E. Shillcock, of Neue, three tiny single-rooted conical teeth, which were removed from between the second upper bicuspid and first molar of a young woman 18 years of age. The molar had been subject to periostitis for three or four years, but these supernumerary teeth nevertheless were quite firm.

Mr. SEFTON SEWILL showed a set of forceps which had been made for him with French lock joints. He thought that forceps were the instruments which ought—of all others—to be aseptic, but which, as ordinarily made, were extremely difficult to keep thoroughly clean. He had found those now exhibited satisfactory in every way, as each pair could be easily taken to pieces and effectively cleansed.

Mr. R. H. WOODHOUSE suggested that the forceps exhibited by Mr. Sewill were open to the serious objection that they would be very liable to catch the lip in the joint. After all, in using forceps it was not so important that the joint should be disinfected as the blade.

Mr. W. HERN showed an instrument he had devised for grasping and removing broken pivot pins from roots. He said that in the case of a pivot breaking off short in a root a considerable amount of labour was caused, and a good deal

of time had to be expended in getting out the pin. The instrument now exhibited he considered a useful one. It consisted of two bi-concave tapering jaws or blades, controlled by a screw with an ordinary cone-bearing point. When the screw was worked it approximated the jaws, and there was a good deal of force at command. He showed also two small trephines, one just pin size, for use in the dental engine, and suggested their use for trephining around the pin, instead of the small fissure bur commonly employed for this purpose, as being a safer and readier method of loosening the pin and giving a grip to the instrument used for its removal.

He also exhibited a somewhat similar instrument with a small mechanical appliance for removing parts of a flexible drill or dressing broach which might be broken off in the canal. The contracted nature of the situation prevented the use of anything like a crocodile jaw, or any widely opening instrument. He had, therefore, devised an instrument much on the same lines as the previous one, the jaws of which were controlled by a sliding tube. The instrument could be made either straight or oblique as required.

Mr. C. ROBRINS mentioned a case of reunited fracture of the maxilla, which came under his notice in the early part of the year. The patient was a gentleman who had been farming in Canada. He was about to visit England, when, returning from his ranche some fifty miles away from his home, the part of the vehicle on which his feet were resting gave way, and he found himself between the hind quarters of the horse and the vehicle and then underneath the car, fixed in and at the mercy of the horse's hoofs for some time. Eventually the wood-work broke away and he was released from his perilous position. Fortunately the horse was not shod or the results would have been very serious. The horse returning to the stables, they knew something was wrong, and returning along the road, the man was found in an insensible condition. The bleeding had somewhat stopped, but his head was very much knocked about, his cheek ripped open, and the face cut open from the angle of the mouth to within an inch of the eye. The left upper lateral and canine were missing. The maxilla was fractured from about the canine region, and the fractured third of of the jaw containing the two bicusps and three molars was dislocated, as far as he could understand, outwards and backwards. The extreme cold had stopped the bleeding. They drove him rapidly to the nearest railway station, fifteen miles off, and thence he

continued his journey by rail. Fortunately he got into the hands of an able Scotch practitioner, who endeavoured to get the fractured part into position, at the first and second attempts unsuccessfully. Chloroform was suggested, but to this the patient objected. He had formerly been a medical student in Edinburgh and, unlike Scotchmen, had a great dread of chloroform. At the third attempt the fractured part was brought into position, as the patient described it, with a click. The face was stitched up, the chin bandaged, and recovery was speedy and satisfactory. He (Mr. Robbins) saw the case about seven weeks after the occurrence, and took the model produced, which showed the condition of things when first he saw him. He advised waiting a few weeks and then put in an ordinary vulcanite plate with three teeth instead of the two, owing to the space between being somewhat larger than before. The occlusion was thrown out by the elongation of the first bicuspid, but by judicious grinding of the cusps the bite was made normal. The case was interesting as showing that although so far away from dental help, it was very well handled by the medical man on the spot, and things righted themselves quickly and well.

Mr. Robbins further related a case of fracture of the maxillary tuberosity. In November last year, a young lady, aged 25, came to him for the removal of the left upper wisdom tooth. The six-year-old molar was standing, but the twelve-year-old molar had been lost for some time, and the wisdom tooth was leaning forward. Gas was administered, and when she went well off, he endeavoured with a pair of bayonet stump forceps to remove the tooth. Having driven up, he began to dislocate, and at that moment there was sudden and unexpected opisthotonos. Finding that something more had given than he intended or desired he immediately released hold and found that a part of the alveolus had fractured, and severe ripping of the gum tissues had taken place. He allowed the patient to come round, explained as much as was necessary, and then found the gum so tenacious that he was compelled to dissect the tooth out of its membranous surroundings. Having done so, the tuberosity was easily picked away with forceps. He had now three large flaps to contend with; one split running into the soft palate, one on the buccal aspect, and a posterior flap almost involving the anterior pillar of the fauces. Going into his workroom he selected a model having a molar, as near as he could tell, the size of the six-year-old molar remaining in the mouth, and

had hastily turned up a deep gold collar, on the posterior aspect of which was soldered a fish-tail flange of gold in a position just to clear the bite. In ten minutes he was able to get to his patient and to adjust the collar on the molar, so that it went on with a spring. The flange of gold was heated and covered with gutta-percha to form the splint. The three flaps were collected together under his fingers; the collar was sprung on the molar, and it seemed to nestle nicely into place. Three days afterwards the splint was removed, when it was found that the healing process was going on well by first intention, except a small place in the palate which was healing by granulation. The splint was retained for a fortnight, when she returned, and the model was taken, which he now exhibited. An accident like that might occur to anyone, and he thought, therefore, he was justified in bringing the case before the Society. Since then he had adapted the same idea to a case of severe hæmorrhage, fitting a collar to the tooth and securing a gold flange, so as to keep the plug in place without interfering with occlusion.

Mr. F. J. BENNETT asked Mr. Robbins if he came to the conclusion that it was absolutely necessary to remove the tuberosity, or whether it might have been possible to leave it, in the hope of its uniting again, and thus preventing any damage to the Eustachian tube or palate muscles. He had seen, unfortunately, cases where the tuberosity had been broken off, a condition which might occur to anyone, but in such cases seeing that the tooth pulp would be ruptured by the force, if it were possible to leave the tooth in place, there would be a little risk of further aching, and it would act as a very good support on which to place a splint. From its vascularity the tuberosity would probably unite to the bone. When the palate was healed up the end of the mischief was not quite certain, because cicatrisation might draw upon the surrounding parts, and cause some damage to the sense of hearing or to the parts themselves.

Mr. ROBBINS said this unfortunate accident occurred twelve months ago. He had seen the patient recently, and she complained of no trouble whatever. It had not occurred to him to replace the tuberosity.

Mr. MAGGS mentioned a case in which the tuberosity had been distinctly moved out of place in an attempt to move an upper wisdom tooth. The operator recognised the difficulty; he helped him to replace it into position, and no further attempt was made to extract. The patient was an old lady.

The case did very well and there was no hæmorrhage. She was seen several times afterwards, and there were no bad effects.

Mr. BALDWIN said from an examination of the specimen produced by Mr. Robbins, it was obvious that the hamular process was not attached. The portion of tuberosity broken through was extremely small and evidently might have become united had it been left.

Mr. FRANK HARRISON mentioned a similar case, the results of which showed that it was better to remove any bone than to leave it.

Mr. W. HERN mentioned a similar case, in which fracture of the right upper maxilla occurred in an attempt to extract an upper molar tooth. The upper jaw was very much torn and lacerated, and there was a good deal of hæmorrhage, but in the result the case did perfectly well.

Dr. W. J. COLLINS then read a Paper on "Orbito-Maxillary Diseases," which is published on page 97.

DISCUSSION.

Mr. S. J. HUTCHINSON said he had the privilege of being in the chair when Dr. Collins read his paper in 1891, and he was the unfortunate user of the word "iconoclastic." The fact was that he had many idols on the subject of reflex influence, and he felt that his best idols were shattered on that occasion. As far as he could follow the paper, Dr. Collins seemed to have taken the following position. Firstly he did not admit that there could be a reflex amaurosis. Secondly, he said that there might be reflex pain but not reflex lesion; and thirdly, that when there was disease it was due to the direct spread of periosteal inflammation. They were of course very much indebted to Dr. Collins for the very interesting series of cases that he had quoted. He (Mr. Hutchinson) admitted that since 1891 he had been on the look out for any chance of controverting Dr. Collins' assertion on that occasion, but he was bound to say he could not produce a single case that could support his own castles in the air and prove ocular disease directly produced by reflex dental irritation. They were greatly indebted to Dr. Collins for his paper and he was glad to think that he (Mr. Hutchinson) might have been in some measure the means of inducing him to write it.

Mr. ROBBINS, though unable to discuss Dr. Collins' paper, wished to mention a case which came under his care some

years ago, and to ask Dr. Collins whether he was right in making the deductions that were made at the time. It was the case of a very anæmic patient, who had been suffering for nine years with extreme neuralgia, who came to him for artificial dentures. He found in the lower jaw on the right side a molar which did not give any reflex signs, but was very much eroded. As it leaned forward and would have thrown the case out entirely, he suggested its removal, and had considerable difficulty in getting it away. He found erosion, evostosis and absorption of the roots. After the removal of the tooth the neuralgia was better, and she localised it in a superior six-year-old molar on the right side. The tooth had been very much stopped. It was a mass of gutta-percha, and in attempting to remove it he took off the crown. The roots were divided and removed. They were badly exostosed, and then a strange thing happened; she seemed to lose the sight on that side. She had constant and extreme lachrymation, and an increase of the neuralgic symptoms, but as the very large wound healed up the signs subsided, and in less than a fortnight she perfectly recovered, and her power of vision became normal.

Mr. F. J. BENNETT said there was no doubt a certain good could be derived from an "iconoclast," for if the images were false, surely it were far better that they should have them broken and make new ones, than continue to worship the false ones. He was extremely pleased the last time Dr. Collins read his paper because there was a case which personally interested him, and which had been put down as reflex amaurosis. It occurred when he was a student at the Hospital, and was brought before the Society by Mr. Coleman and alluded to subsequently by Mr. Henry Power. It was a case in which a root, being prepared for pivoting, exhibited some irritability at the apex. Shortly afterwards there was a good deal of photophobia and irritation about the eye. Thinking it possible that it might be of dental origin, the patient was examined by Mr. Lawson, who said he was positively certain it had nothing whatever to do with the root, but was a case of iritis. His (Mr. Bennett's) experience was extremely small at that time; but it had always appeared to him strange that in the face of that opinion some should have held that it still was undoubtedly reflex amaurosis. Dr. Collins now took an opposite view, and he seemed strengthened in his opinion. They must not forget that co-existence did not always mean cause and effect. There might be a

condition of the eye which gave rise to trouble, and also of the tooth, but because they were so co-existent it could not be said that one depended on the other.

Dr. ERNEST CLARKE said Dr. Collins stated it was only the thin orbital plate of the superior maxilla which separated the dental surgeon from the oculist, but he also went on to explain that in pathology there was no separation at all. He wished to congratulate the Society upon having this paper read before it, and expressed the wish that the Ophthalmological Society would follow the example and invite the President to read a paper before it on some dental subject connected with the eye. He (Dr. Ernest Clarke) wished to make one or two remarks upon the subject of so-called reflex dental irritation. For some years he had paid special attention to "eyestrain" in all its forms, and had thought that one thing of itself was very often quite insufficient to produce eyestrain. Hypermetropic astigmatism of itself might not cause eyestrain if the patient was perfectly healthy. He illustrated this by the case of a lady who complained that she suffered very severe headache at every monthly period. She consulted various gynæcologists, and finally came to ask him if he thought it was the eyes which were the cause of the headache. He found she had astigmatism, but the curious part was that she only had these severe attacks at the catamenial periods, at which time she was obliged to keep her bed. Between the periods she was perfectly well. His theory was that the strain was not sufficient to cause the headache except when the system was lowered, and that the catamenia was just the "last straw" which lowered the vital force. So it might be in dental irritation. If dental irritation of itself would cause trouble in the eye and amaurosis, a great many people ought to be blind. He invariably at the Hospital examined the mouths and the teeth of his patients, and the result was very bad indeed. He thought, however, probably the dental irritation might be a "last straw" which caused some trouble in the eye. Two months previously a lady was sent to him by a doctor, with blindness coming on in one eye. Her vision was only one-fourth of normal, and on examination with the ophthalmoscope he found that she had optic neuritis, which appeared to be going on to retinitis. He found two very bad molars in the upper jaw and told her to go and see her dentist, having previously tried the effect of iodide of potash and other drugs, but without result. The vision went down to one-sixth, and before the extraction of the molars

she only saw six-sixtieths. A week after the molars were extracted her vision had got back to normal, and now she was perfectly well. She was perfectly convinced that the trouble was due to the teeth. Those teeth must have been in her mouth many years, and the question was, if that was reflex amaurosis why did not it occur before? Some clue was afforded by the discovery that she had come to the change in life, when so many women were ill, and he supposed this was again the "last straw." He should not dream of saying in the face of what Dr. Collins had stated that this was reflex amaurosis, but certainly there was dental irritation, and on removing the molars the eye got perfectly well. He thought they were rather too apt to use the term "reflex" as a sort of refuge for the destitute when it was desired to find some cause, and if Dr. Collins had done nothing else he had made them alive to the fact that they must not be so ready to call a thing "reflex" if the cause was not easily discoverable.

Dr. COLLINS, in reply, said his task was much easier on this occasion than it had been on the last. There had been hardly any discordant voice, but all seemed to agree in supporting the position which he held on a previous occasion, and which he maintained to-day. He wished to make his position quite clear. It was not that there was never in any instance a reflex lesion of the contents or appurtenances of the orbit as the result of dental irritation; in fact, there were such cases, *e.g.*, reflex spasm of the orbicularis muscle. In the same way as spasm of the masseter muscle arose through reflex action descending through the motor branch of the fifth nerve, so reflex spasm might be traced through the motor seventh nerve. There was no difficulty in explaining such cases. When, however, they endeavoured to associate by an elaborate reflex process the region of the second pair of nerves with the region of the fifth, the anatomical path was anything but clear and distinct: on the other hand the spread of inflammation by contiguity was very obvious and clear. It was flying in the face of the law of parsimony to invoke a difficult explanation when a very direct and obvious one was at hand. He wished that the case mentioned by Dr. Clarke could have been investigated more thoroughly; possibly it might prove to be one of the first cases on record of reflex amaurosis, or it might be relegated to the more direct category of the spread of inflammation. Dr. Clarke rather seemed to agree with him in thinking this the more probable explanation. He had heard of one case of albuminuric retinitis which was attributed

by the patient to the loss of blood following the extraction of several teeth. The ophthalmoscope showed, however, that it was due to Bright's disease, and the patient died from cerebral apoplexy. No doubt in the dusty volumes of the College of Surgeons' library, cases of reflex amaurosis might be found almost *ad nauseum*, but when they came to ophthalmoscopic days and searched the *Transactions* of the Odontological and the Ophthalmic Societies, such cases were either very rare or not to be found. The fact was that the means of investigation which Helmholtz, in 1859, placed in their hands in the shape of the ophthalmoscope, had cleared up many mysteries. He remembered the case referred to by Mr. Bennett, which showed how even a recognised authority like Mr. Coleman, upon faulty ophthalmic records, might regard a case as being one of reflex amaurosis, which when seen by the oculist to Her Majesty was pronounced to be nothing but iritis. He had listened with interest to the case quoted by Mr. Robbins. In that case the dimness of sight might perhaps be attributed to the lacrymation. He was afraid that if he suggested a possible explanation which occurred to him he should be again put down as unduly sceptical. That very afternoon a child came into the out-patient room of the London Temperance Hospital with dilated pupil of the left eye. The commonest cause of mydriasis in out-patient practice was atropine. He said "You have been putting something into that eye." The reply was "Oh, no." But at last he discovered that the little boy's brother had been under his care two or three years ago, and there was a little ointment left over, and that ointment had been used in this case. Such an occurrence was not uncommon. Belladonna was often used as a liniment for neuralgia, and belladonna might produce dimness of vision. That was an element of doubt which ought to be distinctly cleared up before any final conclusion could be drawn. He would not suggest in the presence of Mr. Robbins that that was the real explanation of the case he had mentioned, but it was a point which ought to be borne in mind. In conclusion he expressed the great pleasure he had had in reading his paper. He was glad to find the position he had put forward somewhat timidly some years ago so largely confirmed by the best dental knowledge, and it had been a great satisfaction to him to appear before them again.

The PRESIDENT said it only remained for him in the name of the Society to tender their sincere thanks to Dr. Collins

for kindly coming amongst them on what he hoped would not be the last occasion. Their thanks were also due to those gentlemen who had brought forward Casual Communications.

MANCHESTER ODONTOLOGICAL SOCIETY.

The monthly meeting of the above Society was held at the Dental Hospital, Devonshire Street, All Saints, on Thursday Evening, November 6, 1894, Mr. W. Dougan, President, in the Chair.

ELECTION OF A NEW MEMBER.

Mr. Ernest Latham, L.D.S. Glas., Bloomsbury, Manchester, was elected a resident member.

DEMONSTRATION ON THE INSERTION OF A LOGAN CROWN. BY MR. FRANK HARRISON.

The very carious crown of a right upper central incisor having been excised at the gum margin, by means of a rose bur, the canal in the root was reamed out with a twisted reamer, the face of the root prepared with a Büttner's root facer; a suitable Logan Crown was chosen, and the glaze removed from the portion which was to be fitted to the root. The pin of the crown was put through a hole which had been punched in thick articulating paper, and the whole placed in position *in situ*, and pushed home as far as practicable, by means of a groove cut in the end of a mouth-mirror handle. By this method the impinging point of the crown can be easily determined, and the wedging point of the pin can be indicated by previously smoking it with a burning match or taper. In this manner, a very perfect fit and æsthetic position may be readily obtained.

DEMONSTRATION ON GOLD STOPPING WITH THE BONWILL MALLET AND WEBER-PERRY CORD ENGINE. BY MR. W. A. HOOTON.

The cavity was a mesial one in the first left upper molar, involving also the coronal surface, and running back about half the extent of that surface; and although of considerable size was nowhere of great depth. The preparation of the

cavity being almost completed, the rubber dam was applied, and the filling, which was cohesive throughout, commenced by inserting half-a-dozen Wolrab Cylinders, No. 1, by hand-pressure, using a foot plugger in each hand. Several layers of No. 2 Cylinders were then malletted on, followed by tape, using Kearsing's No. 5 foil folded to 40. The gold was built out to a slight contour only, as there was an original space between the tooth and the bicuspid.

The No. 1 mallet was used.

VOTE OF THANKS.

The cordial thanks of the meeting was accorded to Messrs. Harrison and W. A. Hooton for their excellent demonstrations, which were watched with great interest by a large number of members.

Dental News.

DEATH UNDER NITROUS OXIDE.

Mr. J. Parker, district coroner, held an inquest at the Preston Royal Infirmary, relative to the death of Amy Budden, a domestic servant, 23 years of age, lately living at 25, Ribblesdale place, who died suddenly at the surgery of Mr. N. Miller, dentist, Fishergate, on Jan. 12th, under circumstances as set forth during the inquiry.

Edmund Budden, cashier, Hampton, near London, identified the body of the deceased as that of his daughter. He said she was a domestic servant. He believed she enjoyed good health, and had never heard any complaint of feeling weakly. Her mother died suddenly, and an inquest was held over her.

Mrs. Willan, wife of Mr. Councillor Willan, 25, Ribblesdale place, said that deceased was her servant, and had been in her employ since last July. She was an exceedingly good girl, and most regular in her habits. About five minutes to seven deceased left home to go some errands, and was expected back very soon. As she had not returned at eight o'clock witness began to wonder what was the matter. Deceased had not mentioned that she was going to have a tooth ex-

tracted, nor had she ever complained of toothache. Some time ago deceased said she thought of going to the dentist, and witness asked her to let her know before she went. Her reason for asking that was that she did not think deceased very strong. The matter was never mentioned again. When engaged deceased said she did not feel very strong, and thought the place would suit her on that account, as the duties were light.

By Mr. Miller: The girl's waist was compressed, and witness had asked her whether she was tight-laced, but she replied that she was not.

The coroner said he understood women were always unwilling to admit that.

Witness: I suppose so.

Mr. Willan asked permission to put a question to his wife, and, this being granted, he asked whether witness believed the girl's statement as to not being tight-laced.

Witness said that she did, as there were no other symptoms.

Mr. Nathaniel Miller, surgeon dentist, 95, Fishergate, said that deceased called at his surgery a few minutes to seven, and asked him to take out two teeth, an upper and a lower one. He examined them and found the pain to be caused by the lower tooth altogether. Deceased wanted the gas, and from her appearance witness had no hesitation in administering it. Her appearance was quite normal. He therefore administered nitrous oxide gas, and she took it exceedingly well. She must have had good lungs, as in 35 seconds she was completely unconscious, and it was not unusual to take 45 seconds. She would inhale about three and a half gallons, the average quantity being from three and a half to four gallons. The gas was administered in the presence of Mary Ritson, who was always present in the operating room to assist witness. The tooth was extracted, and the deceased's breath was normal throughout all the operation. In that state the patient was invariably very listless, and therefore he was not surprised that deceased remained listless after the operation. Deceased recovered thorough consciousness in about two and a half minutes after the tooth was extracted. The first morbid symptoms he noticed was a slight pallor down each nostril, and spasmodic breathing, symptoms which alarmed him, and he at once applied nitrite of amyl. This was always given in the case of any heart affection for the purpose of restoring it. He immediately sent for Dr. Collin-

son, and whilst the messenger was away, he resorted to artificial respiration. Dr. Collinson arrived within three minutes and at once injected ether. The deceased was then placed flat on the floor, and they commenced to unfasten the clothing. The corsets were so tightly laced that they had to be torn off. Hot towels were applied to the region of the heart, and artificial respiration maintained till ten minutes to eight. The doctor then applied his stethoscope and pronounced her dead. Witness had been in practice over 25 years, and during that time, had administered the gas over a hundred thousand times. He had administered it that day many times previously, and had used the same gas to the previous patients. He had given the deceased gas before, and she had not suffered any ill effects then.

By the Jury: Had he noticed the deceased was tightly laced, he should not have administered the gas without asking her to unlace. He had already assured himself that the neck was free. In all his practice he had never had occasion to be anxious about tight lacing before. He had only known one death under the operation directly traceable to tight lacing, and that was the case of Lady Milne, at Edinburgh.

Mr. H. W. Collinson, 52, Willesley Square, said that on Saturday night last he was summoned to Mr. Miller's to see the deceased. On arrival, he found Mr. Miller performing artificial respiration upon deceased, who was seated in the operator's chair. She was placed on the floor, and witness injected about 20 minims of ether. He asked the servant to unloose the clothing, while Mr. Miller continued the artificial respiration. Everything possible was done to restore animation, and at the expiration of twenty minutes witness listened over the heart, but could not hear any beating. Witness then held a cold mirror over the mouth, but finding no evidence of respiration he concluded that life was extinct. During the artificial respiration, air was heard to pass in and out of the lungs showing that the passages were quite clear. Observing that the deceased was tightly laced, he asked Mr. Miller's maid to pull the corsets together as they properly ought to be drawn round the body, and found they did not meet by $4\frac{1}{2}$ inches. The measurement round the waist under the stays was 23 inches. She was wearing a No. 18 stays, a difference of five inches. On Sunday morning, assisted by Dr. Turnbull Smith, witness made a post-mortem examination

of the body, which was well nourished, and showed no evidence of previous disease. Her height was 5ft. 2in., and the measurement round the lower part of the chest 28 inches, round the waist $23\frac{3}{4}$, and round the lower part of the body 24 inches. These measurements were normal, and indicated a healthy foundation. Having described the appearance of the internal organs, witness said these denoted that the tight-lacing had been habitual, and he should call the drawing in to the extent of $4\frac{1}{2}$ or 5 inches excessive tight lacing. These conditions would interfere with full respiration and the proper use of the lungs. The cause of death was suffocation, the gas under the conditions stated interfering with the breathing.

By the Jury : It was probable that had she not been tightly laced deceased could have gone through the operation without harm.

By the Coroner : He did not know that he had ever in his medical experience met with a case of such excessive tight lacing.

Dr. Turnbull Smith, who assisted the last witness in the post-mortem examination, said he agreed with Dr. Collinson as to the cause of death. He believed the deceased would most likely have undergone the operation successfully had she not been tightly laced. He saw nothing else to account for death. He believed the amount of gas administered was a proper quantity.

Mary Adelaide Ritson, maid to Mr. Miller, in whose employ she has been since March last, said that after the tooth was extracted, deceased recovered consciousness for about ten minutes, after which she turned very pale down the nostrils and witness was sent for the doctor. Witness proceeded to corroborate the evidence given by Mr. Miller.

This was all the evidence, and the Coroner said that after going somewhat exhaustively into the case it appeared as if death was due to misadventure.

The jury found that death was brought about by misadventure from asphyxia whilst under the influence of nitrous oxide gas, and was the result of excessive tight lacing. They added that they did not consider Mr. Miller in any way to blame, but that he conducted the operation satisfactorily.

PRELIMINARY EXAMINATION.

The General Medical Council have now revised the list of Indian, Colonial, and Foreign examinations which will be accepted in lieu of the Medical Preliminary, and have agreed that after Oct. 1, 1895, no certificate will be accepted by the Registrar unless it shows that the examination has been conducted by or under the authority of the body granting it, includes all the subjects required by the Council, and states that all have been passed at the same time.

ANSWER TO CORRESPONDENT.

F. S.—We believe that the views of the Royal College of Surgeons upon what constitutes “advertising” have recently undergone some change. It would be well for you to address a question to the Registrar.—ED.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
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British Journal of Dental Science.

No. 650. LONDON, FEB. 15, 1895. VOL. XXXVIII.

TOOTH BRUSHES, THEIR SHAPE AND SIZE, AND HOW TO USE THEM.*

By EDWARD LUND, F.R.C.S.,

Consulting Surgeon to the Manchester Royal Infirmary,
Emeritus Professor of Surgery in the Victoria University,
&c., &c.

Mr. President and Gentlemen,—The toilet of the teeth, as a subject of personal habit, is one of great value in the preservation of health, and the prolongation of life.

Our present mode of living, which we pursue almost unconsciously and often in ignorance of the laws of health, which we violate every day, and particularly by those of us who live and work in large and crowded communities—in vitiated air and at a railway speed,—is in its nature so entirely at variance with that of primitive life, that it would be useless to ask when special attention was first directed to the condition of the teeth and the prevention of decay, and when such attempts were first made to bring about this desirable result by the use of tooth brushes and like appliances;—and least of all is it apparent, upon what principles these means have been practised so as to suggest the title of this short communication to-night on “Tooth Brushes : their Shape and Size, and How to Use them.”

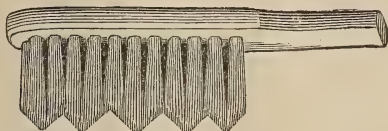
* Read before the Manchester Odontological Society.

That the methods I am about to advocate are often departed from will be evident to any one who has had opportunities such as I have had, for observing the various kinds of tooth brushes in daily use among different persons,—if indeed they are in daily use!—and which I have seen in my visits to patients at their own houses, in their dressing-rooms and in their lavatories. Here I have been greatly astonished in noticing the size of the tooth brushes I have met with, and which I presumed were in occasional, if not in daily use. Brushes to all appearance nearly half worn out by rough usage, yet at one time large enough to fill up, while brushing the teeth, the space in the mouth between the dental arches and the cheeks, within that buccal cavity where particles of food are apt to lodge, and there remain unless purposely removed. This retention being caused, no doubt, by failure in the natural co-ordination in muscular action which should occur during mastication, between the tongue and the buccinator muscles, returning from time to time the broken food on to the teeth, as it is squeezed out from their grinding surfaces. A much smaller brush than I have usually seen on these occasions would, I venture to say, do its work more effectually in cleaning the teeth, than the old, large tooth brush of ordinary dimensions.

Large tooth brushes are still made for brushing the teeth, as will be seen by such examples as in Mr. Williams' tooth brush, and the tooth brush of Dr. Pierrepont's pattern, either of which, when in use, must take up a great deal of room in the interior of the mouth, and distend the cheek to an excessive degree. The form of tooth brush suggested by Mr. Williams has one peculiarity of great value. In it, the bristles of which the brush is built up are cut of unequal lengths, the combined surface on the face of the brush not being perfectly flat, as in the old form of tooth brush, and in it this particular arrangement of the bristles has been well

carried out. It is the same in principle as that to be found in the varying lengths of the bristles in hair brushes and clothes brushes, in which the points of the bristles are fixed at different levels, and in this way the penetrating action of these brushes is much increased.

The tooth brush which is to my mind the *beau ideal* of such brushes, is one not larger than what I now show you. It can be placed easily in the mouth and there made to



TOOTH BRUSH AS SUGGESTED BY MR. LUND.

travel freely over the buccal surfaces of the teeth ; the bristles by their elasticity spring out as the brush is moved backwards and forwards, and they pass over longer distances, and with greater power dislodge foreign matters, than can the bristles of brushes made on a longer, larger scale. With a long, large brush, the free points of the bristles are apt to continue stationary, and, as the brush handle is driven along in and out of the mouth, only the attached end of each bristle is forced to and fro, while the point itself remains nearly at the same spot on the tooth. Whereas with a short small brush there must, of necessity, be greater change of place impressed upon the movements of the bristles themselves at their points as well as at their attached ends, so that, in this way alone, a tooth brush which is narrow as well as short, provided it has been well made, with bristles of different lengths, and firmly fixed in the brush, can be moved about over a wide, and ever changing area of tooth-surface, whilst a certain motion of rotating the handle of the brush in its long axis can also be practised. This action will help

to dislodge and draw away any matter from the gums and necks of the teeth towards their antagonizing surfaces, emptying, it may be, by the same movement, cracks, and recesses in deep carious cavities, and thus remove particles of food therein deposited.

It must also be observed that when we employ a small tooth brush, it can be brought more easily into contact with the lingual aspect of the lower molar teeth, if the brush be kept under the edge of the tongue, where there is always a pool of saliva holding in suspension minute portions of food, in addition to deposits from the fluid itself, and those should be got rid of by the brushing and cleaning.

There may possibly be an advantage in having the back of a tooth brush, similar to that of Mr. Williams' pattern, made convex, and the bristles with a parallel curve, for they will produce a concavity in the brush when it is lightly pressed against the teeth, and into this hollow space the fragments of food will fall readily, and not cling or stick into the brush. A similar effect can be secured by that shape of tooth brush which, I am told, is called the *castellated brush*, in which the bristles are set in rows of long and short bristles with spaces between the rows, these running transversely across the face of the brush. It is a form of tooth brush which I had made for my own use and that of my friends many years ago, and it is one which I still like very much. Mr. Wood, the surgical instrument maker, of King Street, now of Cross Street, Manchester, tells me he has had this pattern and size of tooth brush for nearly twenty years, although I do not hear that many of his customers have adopted it. Recently this shape has been made and sold pretty generally, and it is known in the tooth brush trade, as the "*castellated pattern*," the brushing surface being fashioned so as to suggest such an architectural outline and figure.

In the use of any tooth brush, it may well be asked, shall

we employ a hard or a soft brush? To this I would reply, the brush should have such strength or resisting power, *in the bristles*, as will help to reduce vascularity in the gums, if such a state has existed, thereby emptying the blood vessels of the part, and causing contraction, with gradual retraction and shrinking of the gum, until it is restored to its nearly natural level. When this result has been attained, the margin of the gum will keep more closely to the neck of the tooth, and the inflexion of the mucous surface, and the depth of the groove around the tooth, will be reduced to a minimum. This, of course, is on the assumption that there has been, previously, neglect in the regular use of the tooth brush, and consequently some amount of chronic congestion of the gums, and this being removed, a more healthy condition will be secured. This improved condition being once established, the daily friction on the gum will serve to harden and consolidate its tissues, and make it better able to resist the effects of pressure in the mastication of the denser and coarser kinds of food. A tooth brush made, for example, of very soft bristles, or of badger's hair, or goat's hair, or even of vulcanised india rubber moulded into the shape of a brush with fine projections on its surface, such as I here show, and which was given to me by an eminent dentist in London, the late Mr. Napier; none of these would produce the same hardening, strengthening action on the margin of the gum, as would follow the frequent use of brushes formed of bristles or similar hard substances. I am quite aware, however, that some limit should be set on the extent to which *this rough treatment* of the gum edges by hard brushes can be carried out with safety. It has been said, that grooving and horizontal scratchings of the enamel in certain direct lines of action, have been caused by very hard brushing of the teeth. Sir John Tomes observed cases in which these mechanical effects were very conspicuous, and clearly traceable to ex-

cessive use of the brush. But perhaps these changes may really have been assisted by the presence of less resisting power in the enamel itself, with less of that porcelain-like hardness which exists, where that structure has been healthily developed. There must be moderation in all things—even in the strength of the bristles of tooth brushes, and the way in which they ought to be used. To show you how extremes meet, it is not many years since, that I asked a dentist of great eminence, for whose opinion I had the highest respect, to tell me his opinion of the proper hardness of tooth brushes, he replied, “you cannot use too hard a brush, use a brush made of wire if you can get one! The more roughly you treat your gums in brushing your teeth the harder and firmer they will become!”

In observing the natural sensitiveness of the margin of the gum around the neck of a tooth, just where the vascular layer ceases, or is itself carried onwards as a basement membrane into the alveolar recess, and there becomes continuous with its periosteal lining, here it is you may detect that beautiful duplication of tissue, which does not actually touch the neck of the tooth, but leaves around it an exceedingly minute space, groove, or furrow, which it is of great importance should be carefully noted. The saliva will not remain in it, by reason of its shallowness, nor, by its slight width, will it permit minute particles of food to rest within it. Yet, if, from any cause, frequently constitutional, undue vascularity of the membrane has been set up, the mucous surface will swell and project away from the tooth, and so the exact figure and capacity of this groove will be altered. It is into this enlarged and deepened groove that portions of food get fixed, the saliva does not flow away, but becomes stagnant for a time; certain chemical changes occur, increased congestion follows this, and a gradual deposit of phosphatic lime salts, epithelial debris, and other substances will there accu-

mulate, and solidify into a mass of tartar, or salivary calculus which, once started, will increase in volume, unless quickly dislodged and removed. Dentists, with far larger fields of observation than I have ever had, can best decide how far, in the example I have just portrayed, the red vascular line on the edge of the gum, seen in cases where tooth cleaning has not been habitually practised, is to be regarded as a result of previous tartar upon it, or, if this vascularity in the folded edge of the gum, and the deepened groove, should be accounted as an effect, rather than being due to some other primary cause ; so difficult is it to say in such matters as these, what is the *post hoc* and what the *propter hoc* in morbid changes !

It seems to me in considering this subject of brushing and cleaning the teeth, that two movements of the brush are to be carefully performed. One horizontal, to draw or push the bristles along the groove of the gum near to the teeth, and clear away the earlier deposit of tartar or foreign matters ; and the other action, partially semi-rotatory in its direction, should be made with the object of lifting up the same materials, and carrying them away from the gums into the space around the teeth, whence they can be expelled from the mouth by freely washing and cleansing the cavity.

As to attempt to polish the surfaces of the teeth, particularly in dealing with the upper central incisors, which are prominent, and perhaps the only teeth which the person himself will care to clean and polish, this, I think, is rather a doubtful process to be proceeded with. It can be done at the risk of injury to the delicate structure of the enamel, and it should only be commenced where some definite object is to be attained, such as, for example, enlarging or smoothing out a cavity that it be less likely to retain the food, in filing away the rough edges of a broken tooth, or for some other purpose ; nor is it wise to use gritty tooth powder indiscrimin-

ately, with the idea of adding to the friction of powerful brushing. These are proceedings which should be in the hands of the dentist himself, and be left to his experience and judgment.

For merely polishing purposes, something might be said in favour of polishers made of sponge or soft leather, stretched on a handle, and rubbed across the surface of a tooth, with or without any tooth powder; but, in this method, we can only act upon the most projecting part of the surface, for we cannot, with such instruments, dip into the interspaces around or between the teeth.

As to other more direct means of removing tartar between the teeth, or accumulations of portions of food in carious cavities, *tooth-picks* may be used—the *cure-dents* of the French—and safely trusted. They are made of metal in a very thin plate, not sharp at the edge, or at all rough so as to wound the gum, a small piece of quill, which, being flexible, readily adjusts itself to any tortuous course, or, a piece of cane suitably fashioned and thinned and somewhat pointed. Any of these are useful, and will give immediate relief, when the tooth brush cannot be conveniently used.

The mode of dislodging such substances, which are frequently the starting centres of further trouble, pressing upon the edge of the gum and eventually displacing and loosening the teeth in their sockets, which I know is now much relied upon by dentists, is to draw prepared *waxed floss silk*, which we, as surgeons, have known for many years under the name of "*Dentists' silk*," and which was reputed to be of immense strength for the calibre of the silk,—this *waxed silk*, pressed in between the teeth, from the biting surface towards the roots, and then drawn steadily out in the length of the silk and again applied, by a succession of these movements, will be very effective in cleansing contiguous teeth, even where they are very closely packed in the jaw. One chief reason

for adopting these methods of freeing the interspaces of the teeth from foreign bodies, is brought about by the gradual recession of the gum from the necks of the teeth which is only one of many other early senile changes, which dentists are able to observe, the subject of them being in ignorance of their steady advance. Young persons rarely require to use a tooth-pick, for the substances detained between or near to the teeth in early life, are generally held in cavities, or upon irregular portions of the crowns or sides of the teeth, which are produced by early caries, often painless, and therefore unknown and unobserved by the person himself. There can be no doubt, if any one, in youth or in middle age, has always to use a tooth-pick at the conclusion of a meal,—the sooner he consults a dentist and has his teeth properly inspected and their condition discovered and improved, the more likely he will be to preserve his teeth, and to be relieved from the constant wearying habit of *raking out his tooth spaces*, every time he has finished taking his food.

The surfaces of the teeth in the lower jaw, which, I think, are the least easily dealt with by the tooth brush to remove early deposit of tartar and other concretions, are the posterior or lingual faces of the four lower incisors. Here it is extremely difficult to get the brush to act correctly upon them. It is not easy to make the horizontal movement of the bristles from side to side at that part of the mouth, and so to clear the grooves in the gums; and even to use the brush vertically, will not always help us to lift up any deposit which may be fixed there. Perhaps, therefore, the passage of the point of a quill, or a thin metal tooth-pick, directed backwards between the necks of the incisors, will dislodge the deposit, if there be room enough for the passage of the tooth-pick; or the same result can be accomplished by the use of the waxed silk, placed between the neighbouring teeth and drawing it in a direction from the chin to the tip of the

tongue, and so dragging any accretions, if they have not become too tightly fixed.

There is yet another subject, in reference to the cleaning of teeth, on which I would wish to make a few remarks. It is as to the management of artificial teeth in those who are compelled to use those useful helps to health, or by persons who are willing to begin the use of dentures, upon the advice of those who can tell them what graver evils may be thereby averted. On numerous occasions I have seen the good and lasting results of judicious treatment of the teeth, in patients of advanced age, who have consulted me, for disordered functions which were clearly referable to deficient mastication and imperfect assimilation of their food. In cases in which my patients have been supplied with artificial teeth, and I have afterwards had the opportunity of watching their effect, and also how their dentures have been kept in perfect order for many years with the greatest benefit; I am sorry to say, I have seen some wearing artificial teeth, who have been very neglectful and careless in the use of them. Whatever time ought to be devoted to brushing and cleansing the natural teeth, not less should be given to the artificial teeth. I cannot quite decide in my own mind, whether it is right to tell a patient that his artificial teeth should only be worn in the day time and not in the night; for, I think by this plan the gums, not being constantly submitted to pressure, will in the interval allowed during sleep have much temporary relief. It may be, however, that where a person has already adopted the other plan, and he has kept the artificial teeth in the mouth continuously, night and day, it may not be advisable to change this habit, for some of the original teeth may still remain *in situ*, not very firmly held in their sockets, and being deprived during sleep of the support of their artificial props, the tongue may act unconsciously and press against and slightly displace some of the teeth and interfere with perfect co-

aptation in the denture when it is to be replaced in the daytime. Perhaps, therefore, in every case, we must deal with each on its own merits; but I still incline to the idea of not having the artificial teeth uninterruptedly in position from day to day. The advantage gained by frequent removal and replacement of the denture is, that it will enable the person who wears the teeth, to clean that surface of the plate which is in contact with the arch of the palate and alveolar surfaces of the upper jaw especially. "I have often noticed when artificial teeth are removed only occasionally, but not regularly, some deposit is seen on the metal or vulcanite plate and frame, which, for various reasons, ought to be cleared away; to say nothing of portions of food, caught in the interstices of the teeth themselves.

Lastly, as to the more general question not only how to clean, but when to clean the teeth,—the natural teeth as well as their artificial representatives,—I think this should be done at least once in the twenty-four hours, and I would add, it should be at night—at the end of the day, when, for a time, all further mastication of food is to cease. If it be true that the progress of dental caries, the result of previous injury to the integrity of the enamel,—excited probably by prolonged contact with irritating substances derived from constant changes in the *ingesta*, and these kept for many hours in the warm, moist cavity of the mouth, resting on the exposed dentine,—causes necrotic effects on it and the softened bone, we can understand how many of these results may be diminished, and by the removal of such irritants, even where the carious surfaces in the teeth have not been dealt with by operative proceedings, the caries itself progress less rapidly.

I will not enlarge upon the topics of tooth powders, tooth pastes, liquid dentifrices, and the like; they are too numerous for me to attempt to estimate their comparative value; but I will name one, which I have generally ordered for my

patients when I have been asked to do so, and I cannot refrain from giving you its composition. It is merely, in preparing to brush and clean the teeth, to drop on the dry brush five or ten drops of an aqueous solution of phenol or carbolic acid, in the proportion of one in twenty,—5 per cent.—previously adding to the solution one eighth or one sixth of its volume of eau de cologne or good lavender water; this will conceal the smell of the acid, and give a pleasant odour in place of it. Then, when the tooth brush is so wetted, to draw it across the surface of a piece of good super-fatted soap, and proceed to brush the teeth *en regle*. This liquid forms a most agreeable dentifrice, if we take care to employ proper soap, (Woolley's Boval Cream Soap is an excellent soap for this purpose,) and if only a small quantity of it be taken up on the brush; just enough to allow the excess of fatty matter in the soap to mingle with the acid, which it will do very readily and lessen its acidity, without diminishing its power to destroy various forms of bacterial growths, existing in the mouth.

The specimens of tooth brushes which I here exhibit, have been lent to me for the purpose by Messrs. Claudius Ash & Sons, of London and Manchester; and in the same way on my application to Messrs. Woolley, Son, & Co., of Victoria Bridge, Manchester, Mr. Lane was able to procure for me, on loan, from Messrs. Kent & Son, of London, samples, sixteen in number, of large old tooth brushes, which were in use "when George the Third was king." And from Messrs. Jewsbury & Brown, of Manchester, I have received illustrations of the manufacture of tooth brushes in all the stages of that process, from sections of the bone of the ox and other animals, to form the handles, up to the completely finished tooth brush; with specimens also of many forms of brushes made in three degrees of hardness in their bristles, as soft, medium, and hard; together with varieties of tooth powders and denti-

frices, each possessing special qualities to recommend it ; and all these articles which Messrs. Jewsbury & Brown have generously offered to me for my acceptance without any cost or charge, I would gladly hand over to your Society, if you think they would prove a useful addition to your collection of dental curiosities.

I can now only thank you, Mr. President and gentlemen, for the attention with which you have listened to me to-night. I know I am here as a visitor, and outside the ordinary paths of your practice, but I feel, we all have one common object in our daily work, and that is, to endeavour to improve our art in every detail, and to advance the practical application of the science of medicine to its fullest extent.

DENTAL MECHANICS.

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Continued from page 120.

THE DENTAL LABORATORY.

THE USE OF TOOLS.

Nothing more conclusively shows the difference between a good experienced workman and a novice, than the manner in which he uses tools and other appliances, in the dental, as well as any other workroom. Not only is this apparent in the handling of the same while doing his work, but is also in a more marked degree shown by his improper selection of tools for purposes they are not intended for.

The rougher portions of our work will here be referred to more particularly, the writer having found, from experience of student life, that it is in this section that one has to look

for the most damage. For example, in drawing wire, instead of using a pair of draw-tongs, a small pair of pliers is taken, a strain is put on the handles greater than they are intended to bear, and as a consequence one of the blades snap off. Again, a small pair of nippers, sufficiently strong for cutting ordinary dental plate, is used to cut something three times as thick, perhaps a tooth on a zinc model. What is the consequence? A fracture. Another instance occurs while drawing wire; it is not dried after annealing, or the draw plate is put in a damp place, and not properly oiled after use; it thus becomes rusty and inaccurate. Again, while rolling gold, the ingot of metal is not cleaned from flux, or is not dry; as a consequence, a valuable set of rollers is spoilt in a very short time.

Tempered broaches are used as if they would bear any strain and are frequently broken the first time of using.

These are some of the abuses of the use of tools, and all of them could be avoided, if one were only to think for a moment that if great force is to be employed it requires a strong instrument, or tool, in proportion. Accidents will happen sometimes, but with a little care and thought, such as have been named can be avoided.

The tools and appliances in the laboratory should be kept in a state of efficiency. New saws in frames when required, sculptors sharp, and drills in good condition. All these matters should be attended to directly work is slack, or there is idle time; by these means, when busy again, one is able to go on with the work with comfort and despatch.

In conclusion, it should be mentioned that all tools, lathes, and appliances requiring it, should be kept clean, bright and well oiled, either with vaseline or goose-grease; both these being lubricants that do not thicken or get sticky.

To clean lathes, etc., when dirty, they should be rubbed with paraffin oil.

WORKROOM ECONOMY.

To study economy while doing his work is one of the earliest principles that should be instilled into the mind of the young beginner, and he should be taught to so habituate himself to carry out the necessary details, that in time it becomes natural to him to do so without an effort.

Foremost among the many channels of waste in the dental workroom is the gold drawer ; this should be provided with a hare's-foot or a large badger-hair tooth brush, that being much softer than the ordinary ones.

When gold is being filed, the drawer should be kept wide open, so that, if a rough file is being used, the small particles of gold do not fly over the edges of the drawer.

Now the drawer cannot be kept properly open if the workman sits too close to his bench-pin, therefore this part of his education should not be neglected. Again, too great stress cannot be laid on the fact, that the gold drawer is not the place for tools of any kind.

If files are used a slight tap on the bench-pin will detach any loose filings that may be adherent to them, and then they should be placed on the bench in front of, or at the right side of the workman.

Should they be put in the gold drawer particles of gold attach themselves to the handles, after they have been in the warm hand, and if they are not brushed clean each time, before using again, (which in itself is a waste of time) considerable losses of gold will take place.

Drills and broaches should be passed through the brush also, and all work after filing, as well as the bench-pin should be brushed before placing the case on the model again.

By attending to these apparently small matters, a considerable saving will take place in the course of a twelvemonth.

With all one's care it is impossible to avoid some waste, but one can account for a large percentage of it, by carefully saving all the dust that collects on the bench, the dirt off the floor, the old rags that one uses for wiping cases, all the sediment that collects in the water-troughs of the lathes, and all the washings of the hands after polishing cases. All these small matters may be overlooked by the inexperienced beginner, and thrown away. The author does not advocate keeping these "sweeps," as they are called, separate, as it entails much extra work, which in the long run does not pay. When a sufficient quantity, say a good-sized barrel full, has been collected, it should be sold to some respectable refiner. To obtain information on this point, it is as well to consult some old dental friend. The author's experience is that refiners are not all alike, in the way they treat their customers. A notable example of this was brought under the writer's notice quite recently. It was a case in which for six or seven years the average for the floor "sweep" did not amount to a pound per annum. On the recommendation of a friend, a new refiner was tried with the result that a cheque for nearly eight times the former amount was received. Taking into consideration that the average of work was about the same, one must naturally conclude that there must have been something wrong somewhere.

Another important consideration is in the consumption of gas, for one may find it flaring away, not only before, but long after it has served its purpose ; this not only represents a money loss, but it also tends to vitiate the surrounding atmosphere, and is detrimental to health.

Again, one might mention the waste that takes place with use of plaster of Paris. This might be avoided if one noticed the amount of plaster necessary for each operation ; in a very short time a fairly accurate idea would be gained of the amount required, and much waste would be avoided.

Now we arrive at another important item, and that is, a loss of time.

Speaking of this, we do not wish it to be understood, that we would curtail the time necessary to do the work effectively and well, but on the contrary, would allow the maximum time if it ensured the work being more perfect. But a great amount of time is lost, especially with the young beginner, in not rectifying an error at once. For instance, if a clasp does not please us by its fit or shape, or if the position of a pin, for a tube tooth, does not seem to us quite as it should be, it is quite as well to get into the habit of altering it at once, than by thinking over it, and so lose more time than it would take to make the necessary alteration two or three times over.

Then again, the workman should always "be doing." If he is waiting for the plate to clean, or the case to cool, he can be going on with the clasps, backing the teeth, or putting his tools into an efficient condition. This is the great secret of rapid working.

While we would advocate diligence in the work, we would at the same time point out that it is not the noisy workman who gets through the most work. Noise is a thing that should on every occasion be avoided. Much noise may be prevented when any hammering has to be done on the bench, by resting the anvil, or block, upon a bag of sand or a thick layer of rags. Swaging up the plate with the model resting on the bench should be considered a gratuitous annoyance to everyone in the workroom, and is to be condemned, considering how easy it is to avoid it.

The uses of the Dental Engine, in the Laboratory :—

The importance of this appliance in the workroom cannot be over-estimated, and if used in a careful and intelligent manner, it will last a considerable time without getting out of order.

For fine-fitting tube teeth to a plate, for letting down a Crown or pivot tooth on to a root, for such fine operations as fitting porcelain facing to bicuspid crowns, it has no equal; the minute wheels, cones and sticks of carborundum which can be used with it, enable one to produce the most perfect results.

Again, for repairing split vulcanite cases, after making a little plaster model of the palate of the case, a fissure bur in the engine can be used to produce a new clean surface to the edges of the fissure, by first of all running the bur through the plate and drawing it from one end of the split to the other, after which lateral cuts can be made on each side for the further strengthening of the new rubber.

For hollowing out spaces in a rubber plate for the introduction of a strengthener, for easing cases over roots; for removing the drags on rubber cases corresponding to the necks of the teeth, a large rose bur is most suitable and does the work neatly and well.

For removing a tooth or gum block from a case, a small bur can be used to work around the pins and remove the block without damage to the case.

For polishing the inside of gold plates, clasps, and round about the backs of the teeth, also in the indentations of the rugæ, the engine can be employed with effect, as the extremely small appliances used with it can be introduced into the most constricted space.

One is also enabled to mount a small circular saw, which can be used as well as a wheel for removing a metal back from a plate.

These are a few examples of the uses the engine can be put to, and for which it is especially adapted.

To make the little chucks to carry the small wheels, &c., a piece of round polished steel wire is obtained the same thickness as an engine bur. The wire is nicked deeply at

suitable lengths with a file, and snapped off, and then the ends are filed smooth.

These pieces are held very firmly in a Hodge handpiece.

We now take some German silver tube that will just fit the wire. Cut the tube into lengths, of an inch long, and file each end level. We must next slip one of these tubes on to the wire, leaving the end protruding about one-eighth of an inch. We solder the tube to the wire with silver solder. By this means a shoulder is formed for the wheel to rest against.

A porte-polisher for carrying points of corundum, or carborundum, can also be very simply made, by soldering a tube on to the steel wire, letting the end of the tube project about half to three quarters of an inch. This projecting portion can be tapered a little and split. To fix the carborundum point, melt a little shellac into the tube, then make the carborundum point hot, and press it into the melted shellac.

THE MATERIALS USED IN THE DENTAL LABORATORY.

These may be grouped in the following order.

For moulding in sand.

Sand, or loam.

Pumice, Brickdust,

French chalk,

Lycopodium.

and Common Resin.

This latter is used to give a carbon surface to a sand or other cast. A stick of ordinary firewood is taken and either dipped into melted resin, or the resin is melted over a flame and dropped on to the wood. It is then set alight, and holding the sand mould over the smoke of the resin, the surface of the sand is coated with a black deposit in a few moments.

By coating the sand or other mould in this manner a better surface is obtained to the resulting model.

For polishing purposes.

Pumice, rouge, whitening, water-of-Ayr stone, sandpaper—and for polishing steel, emery and oil.

The art of polishing, is to produce first of all a perfectly smooth surface, free from scratches and irregularities. This should be accomplished with the sculptor and smooth file. Afterwards sandpaper and water-of-Ayr stone must be used. A good surface should be put on a case before it is taken to the lathe, so that only a moderate amount of rubbing with pumice and oil (if a gold plate), or pumice and water (if a vulcanite plate), need be used, and the final finish may be given with rouge, or whitening and water.

For modelling purposes.

Beeswax, yellow and white, paraffin, resin, and, as a colouring matter for the wax, carmine.

The *coarse metals* in general use *for casting purposes* are :—

Lead, zinc, tin, type metal, fusible metal, meter metal, and Sullivan's cement.

Sullivan's cement may be prepared in the following manner :—

Make a saturated solution of sulphate of copper in boiling water. Then place in the solution several pieces of sheet zinc. The copper will be immediately precipitated. Pour off the water and wash the precipitate several times in weak sulphuric acid ; this will dissolve out all the zinc. Now add to the copper precipitate a sufficient quantity of mercury to amalgamate with, and form it into a stiff paste. The surplus mercury is expressed from the mass, by squeezing in a piece of chamois leather. It should now be moulded into small pellets and allowed to harden.

Sullivan's cement comes in for many useful purposes, such as making models for crowns, or unwearable teeth for plaster models. If used for these purposes, it should be softened and pressed into the cavities representing the teeth in the impression. The impression is then filled up with plaster of Paris and allowed at least eight hours to harden, before it is placed in hot water to remove the composition. We shall thus have a plaster model with teeth of Sullivan's cement.

Materials for models.

Plaster of Paris of the finest quantity should be used for this purpose, this is known as "superfine" For other purposes than models, a lower grade of plaster may be used.

To prepare a plaster model for a gold plate, it should be carefully, that is slowly dried, and then while still warm placed in hot melted stearine, or in melted wax and resin, or it may be varnished with methylated brown spirit varnish. The object of thus preparing it, is to harden the model so that it is less liable to be rubbed during the swaging of the plate, and fitting of the clasps, and it also makes the model nicer to handle.

Materials used as a *parting medium* between

1st. Two surfaces of composition. Vaseline, French chalk, or soap.

2nd. Between two surfaces of wet plaster. Soap, or vaseline, preferably the former.

3rd. Between hard rubber and a plaster surface. French chalk, silicate of soda; thick tin foil, or meter metal, or before the rubber is vulcanized, French chalk or a piece of linen. This latter should be dipped in hot water before applying it.

Acids used for *cleaning plates*.

For gold, hydrochloric acid.

For silver and dental alloy, sulphuric acid.

These may be used slightly diluted, and kept in an ordinary gallipot fitted with a cover. When it is found necessary to boil the case out in sulphuric acid a copper dish may be used for that purpose, and the fumes of the acid allowed to escape up the chimney.

Materials used as a flux for soldering purposes.

Borax for Gold, Silver, Platinum, Dental Alloy, Copper and Brass. Zinc chloride for tin, Lead, Zinc, or Pewter.

Chemicals used for *collecting and purifying* gold filings, Potassium Carbonate, Potassium Nitrate, Sodium chloride, Hydrargyrum bichloride. When the filings are collected into a button, this should be remelted with borax.

(*To be continued.*)

DENTAL PLATE REMOVED FROM ŒSOPHAGUS.

By J. C. HOWIE.

Remarks on Foreign Bodies in the Pharynx and Œsophagus.

Fish bones and pins are liable to be caught in the pillars of the fauces, or in the tonsils, or may be fixed transversely across the pharynx. They cause much pain in swallowing. In these cases it is best, if possible, to try to search for the foreign body by the laryngoscope, and then to grasp it by suitable forceps or by the finger nail, while the pharynx is illuminated. This is a safer method than the plan of feeling for it with the finger without a light—and risking its passing down into the larynx. The tongue must be well pulled forwards with a sponge cloth, and the patient induced to continue breathing regularly, after first drawing a long breath. If the object is beyond the reach of a curved forceps or of the finger, it may be removed by the expanding horse-hair extractor, or by a coin-catcher. If these methods still fail, first without chloroform and afterwards with its use, then it is necessary to perform pharyngotomy.

Glasgow Medical Journal.

British Journal of Dental Science.

LONDON, FEBRUARY 15th, 1895.

THE DENTAL CURRICULUM.

THE Education and Examination of the modern Dentist is the result of a gradual progress similar to that which has taken place in other professional circles. And it is only natural to imagine that the process will continue. Most will agree upon this point, and dissension will mainly occur as to the direction in which changes should be made. One party, perhaps in favour of the institution of a "higher Dental Diploma," would restrain the elaboration of the General Surgery side of the curriculum ; whilst others, who are accused of trying to manufacture medical Dentists, contend that, at all events in England, the Dental student should be called upon to pass the same examination in Anatomy and Physiology as the medical student. Both these classes of teachers, however, are probably agreed that there is one subject which is essentially a matter for immediate consideration. We have before alluded to the circumstances under which the dental *pupil*, before he becomes the hospital dental *student*, is expected to learn his Dental Mechanics. It is not too much to say that this is the part of the Curriculum which has recently become, and still continues, the topic for discussion when educational matters are brought forward at Society meetings. We have heard it suggested that as now the Candidates are more thoroughly examined in Mechanical Dentistry at the College examinations, the thing will regulate itself, and that students will take care to be prepared. But so long as the apprenticeship is merely dependent upon the certificate of a possibly casual master who ignores his responsibility, there is always a

danger that the former pupil will find it necessary to make up for lost time, by preparing himself in the neglected subject, at the very moment when all his energies are required to perfect his knowledge and skill in the other branches. We believe that in the near future the Dental Schools and certain practitioners who make a specialty of teaching Mechanics will alone be selected by parents and guardians when making the necessary arrangements for apprenticeship.

A point of much importance has just been raised (although of course not unheard of before) by Mr. NEWLAND-PEDLEY in a letter to *The Lancet*. It is there pointed out that the third year of mechanical training, supposed to be required, is usually ignored, and "in many cases the apprenticeship is merely nominal." Mr. NEWLAND-PEDLEY with some force, which perhaps is reasonable, says:—"There is no earthly reason why students should not be compelled to pass a practical examination in dental mechanics before they enter hospital, and this would prevent the possibility of two or three of the best years of a young man's life being wasted or would throw the onus of his failure on those who accepted the premium for his apprenticeship." So speaks a Guy's representative, and Mr. STORER BENNETT of the London School of Dental Surgery writes to support the proposal of an examination in mechanics before the surgical training is commenced. He suggests that the Royal College of Surgeons should hold this examination, but it is just possible that this Body has no power under its present Charter to alter its present scheme. The Medical Committee of the National Dental Hospital have, we believe, already passed a resolution to the same effect and invited a consultation of the various Dental Schools throughout the Country. The question seems ripe for serious discussion, and, although at first sight there may appear some difficulty as to who is to conduct the proposed examination, it would be at least interesting to have any valid objections to the theoretical value of such a preliminary examination fully set out.

In the letter referred to above, Mr. NEWLAND-PEDLEY expresses the belief that the present final examination at

the English College might well be sub-divided as is, indeed, done elsewhere ; he thinks another year should be added to the present hospital curriculum at the end of which period Surgery, Dental Surgery, and practical Dental Surgery should form the subjects of the Final Examination, the others having been taken at the end of the second year. Instead of stopping to criticise this scheme at the present moment, let us notice another letter, an antithesis, this time in *The Chemist and Druggist*. This Journal published an article in favour of unregistered dentists, and announced the formation of an "Unregistered Dental Practitioners' Defence Association," giving the names and addresses of president and secretary. The latter replied to a criticism that it was not likely to be a very representative association as an almost prohibitive entrance-fee is demanded. According to this official there is a membership of sixty-five "practitioners" and thirty more have promised. The letter is somewhat diffuse, but we gather that if the members are admitted to the Dentists' Register all will be well ; we are not told, however, how this happy consummation is to be attained. "As we accept none but *bona-fide* practitioners, (*sic*) and whose character and abilities will bear investigating, we contend that we are equal (having large practices) and have a perfect right to be recognised in the near future, and we are determined that it shall be of such a standard of perfection (so that it will be esteemed by the British public); hence as you say, the large fee of two guineas." Is it possible that the future student will have to weigh delicately the advantages of the following. Preliminary Examination in General Education ; Three years' Mechanical training followed by an Examination ; two years' hospital practice and lectures followed by an Examination ; a third year's hospital work with another (the fourth) Examination ; a diploma ; five pounds sterling for Registration. Should he not rather make himself eligible as a *bona-fide* practitioner(!) and then proffer two guineas to a defence association ? We think we can venture to assure him ; if he wishes for the esteem of the British public he will select the former task, or its present equivalent.

THE HYDROTHERAPEUTIC TREATMENT OF NEURALGIA.—The alternating Scotch douche has been recommended by BUXBAUM for neuralgia. The patient is first exposed to a high temperature and then cold applications are employed. In eighty-three cases where the treatment was used, 60 per cent. were cured, in 5 per cent. it failed, and the remainder were relieved. In trigeminal neuralgia it is recommended that the treatment should be applied to the whole body, but anæmia, malaria, and other conditions must of course also be attended to. Where rheumatism is a cause, the treatment acts by inducing an increased supply of blood to the part, and in cases of poisoning by mercury, lead, or the infecting diseases, it promotes the elimination of the deleterious matters. In the author's opinion, if the neuralgia persists the cases are hopeless, except a few which may be suitable for operation. Cases of sciatica which had resisted nerve-stretching, are said to have been quickly cured by hydrotherapy.

POISONING BY COCAINE.—Dr. E. J. Walker, records in *The Lancet*, the case of a healthy young man, aged twenty-four years, who took, in mistake for phenacetin to relieve toothache, eight or nine grains of cocaine. A pleasant coolness spread over the entire body, followed by a feeling of numbness in the mouth, tongue and throat. Then came a sense of choking and desire to swallow. He was given a stimulating draught, and still feeling queer, and in ignorance of what he had taken, he substituted a bowl of gruel for his usual dinner. Four hours and a half after the dose, there was a sense of constriction at the throat and over the heart, difficulty in swallowing, palpitation, sense of oppression, and mental dullness. The pupils were dilated and did not act to light, the temperature was sub-normal and the pulse almost uncountable. The most striking feature was a movement of the muscles as in a bad case of chorea. The uncontrollable action of the muscles of mastication gave the appearance of chewing, but the patient was quite unable to

eat. There was occasional lividity round the lips and difficulty in breathing; this was immediately relieved by inhaling nitrite of amyl. For other treatment a drop of croton oil and five grains of calomel were placed on the tongue. After the purgatives had well acted the symptoms gradually subsided and next day the patient appeared quite well, but complained of slight weakness.

DEATH OF Mr. S. M. BURROUGHS.—The death is announced of Mr. Burroughs, the founder of the well-known firm of Burroughs, Wellcome and Co., which has done so much for advanced pharmacy. Mr. Burroughs was at Monte Carlo when attacked by pneumonia which proved fatal after a short illness. The deceased gentleman, who was forty-eight years of age, had innumerable friends in all parts of the world and the news of his death will come as a blow to many who recognized his generous and kind-hearted character.

THE RELATIVE LOSS OF THE PERMANENT TEETH.—The statistics published in Tomes' Dental Surgery as to relative frequency of the loss of the permanent teeth are well-known. In *Guy's Hospital Gazette* are some interesting figures, prepared by Dr. J. W. PARE and Mr. WALLIS, which deal with a total of over 30,000 extracted teeth, the record extending over a long period. The lower first molars head the list with more than 18 per cent; and then come the upper first molars, together making over 36 per cent. After the second molars (19 per cent.) the second bicuspid are most frequently lost (13 per cent). It is interesting to find that the relative order throughout is the same as that given by the figures of Sir JOHN TOMES, although the percentages vary slightly and the gross number of teeth dealt with is ten times larger. The authors draw attention to the practical use of such statistics in dealing with those regulation cases in which extraction is necessary.

CARIOUS TEETH AND THE PUBLIC SERVICES.—From time to time patients consult their dentist when about to be examined for one of the Services; and it is sometimes doubtful as to what standard of denture is required. On other occasions we find the patient has been referred to his dentist by the examiner, and the question of artificial substitutes arises. In the event of the examinee proceeding to some distant part, where dental services are not to be obtained, the matter may be important. A correspondent writing to the *British Medical Journal* for information is informed that if the teeth of a candidate for the Medical Service are extensively diseased, or if several be wanting he would be declined. If, however, he reappeared with his mouth fitted for mastication by the dental art, and there were no other objections, he would be accepted. Each case would be decided on its own merits. Obviously these patients should have everything done in the way of filling and crowning that may be possible, and the substitution of artificial dentures, which may need repair, should only be relied upon in otherwise hopeless cases.

PERSONATION AT EXAMINATIONS.--The possibility of a capable candidate entering for an examination in the name of an incapable one, and thus securing a certificate for the latter, depends partly, no doubt, upon the kind of examination. Neither men should be known personally at the place where it is held, and a *viva voce* would add to the danger of discovery. Then again a subsequent quarrel between the confederates, or a black-mail, may prove awkward. A Scotch doctor has just successfully defended an action for libel brought against him by a druggist's assistant. The defender had asserted that pursuer had, by means of impersonation passed the preliminary examination of the Pharmaceutical Society. The alleged personating candidate admitted that after a quarrel he told some companions that he had passed the pursuer's examination, and the Sheriff thought that he would have probably made a clean breast of the matter in

the witness-box if he could only have got a sufficient guarantee against subsequent proceedings against himself. Other evidence, however, allowed the Sheriff to find that the defender's statements were true, and that he was not liable to the damages for £500 claimed against him.

ANOTHER INTERNATIONAL DENTAL CONGRESS.—We understand that consultations are taking place as to where the next Dental Congress shall be held. According to our information, France is to have the meeting in 1900. The one in 1897 *might possibly* be arranged for England if any marked desire to that effect is made known. Otherwise Germany will probably be chosen, and our turn would not come until 1903!

Manipulative Miscellany,

It is requested that all new instruments or articles which it is wished to have described under this heading, be sent *for inspection* to the publisher not later than the 8th and 23rd of each month, they can be returned in a few days. Where, from the size or otherwise, this is impracticable, a clear and minute description will be sufficient; the sole object being to give practitioners a description of everything new, on its own merits and without any intention or wish to pit one against another. All makers, vendors, and inventors, are invited, with strict impartiality, to contribute towards this end.

JAMIESON'S CRYSTAL CEMENT.

We have received a sample package of this Cement which is apparently one of the Oxy-Phosphates. Mixed to the usual consistence, it sets hard and fairly rapidly, but leaves a good margin for working. Two portions were prepared at the same time, one upon a slab of glass, the other on a polished vulcanite surface. At the end of twenty minutes both were apparently quite hard.

Review.

DESCRIPTIVE ANATOMY OF THE HUMAN TEETH. Third Edition. By G. V. Black, M.D., D.D.S., Sc.D. The Wilmington Dental Manufacturing Co., Philadelphia, 1894.

This is a book which well repays reading. It treats of a branch of Odontology, which there is reason to fear is much overlooked. The author renders the subject of normal microscopic anatomy, not only interesting, but decidedly useful from the practical point of view, for a practitioner will become a more confident operator in proportion as he is acquainted with the facts set out in this work. Then again, the question of nomenclature is not so unimportant for the scientific dentist as some may consider, for such a practitioner will want to keep an accurate record of his work. Readers of former editions of Dr. Black's book will remember that a systematic scheme of nomenclature forms a distinct feature. Take, for instance, the words sulcus, groove, and fissure, which are frequently used in a more or less loose fashion as if the terms were synonymous. The author points out that a generally rounded or angular depression on the surface of a tooth should be called a *fossa*. This occurs principally on the molars and when "long-shaped" constitutes a *sulcus*. A shallow, long-shaped depression, in the form of a line, on the surface of a tooth, is called a *groove*, and when such a groove sinks suddenly into the substance of a tooth in the form of a *fault in development*, it should be described as a *fissure*. Although no doubt a matter of difficulty, it is much to be desired that some widely accepted system of nomenclature may before long come into use. Amongst the numerous illustrations in this book are some diagrams of pulp-chambers and root-canals which should prove useful to students.

Abstracts of British & Foreign Journals.

METHODS OF DESTROYING DENTAL PULPS.

By GEO. A. MAXFIELD, D.D.S.

The many theories as to the best method of applying arsenic, and the almost universal expression of unsatisfactory results, show the necessity of something better for this purpose. The application of arsenic in a tooth causes pain more or less severe, continuing from one to several hours. How to obviate this pain is an important question. One advances a theory explaining why arsenic should cause pain, and gives directions for making the application, affirming that no pain will result. Another follows these directions, but with an entirely different experience. Then, to harmonize the different experiences, we hear this phrase often repeated: "Arsenic works differently in different localities." My experience, like that of many others, has been so unsatisfactory that I question the statement that arsenic always works satisfactorily and painlessly. In my experience, if arsenic was placed in a tooth where there was no exposure of the pulp, pain always resulted; but when applied to an exposed pulp, I have sometimes succeeded in devitalizing it without causing pain. With many this is a light, steady, annoying pain, lasting for several hours, exceedingly exasperating; and with others a severe, throbbing pain, almost unbearable, but not continuing more than an hour or two. One writer has said, "The pain resulting from the application of arsenic is evidence that the arsenic is doing its work, and when the pain has been severe we are sure to find the pulp devitalized in a few hours; that if there is no pain, it will take days or weeks for the pulp to die." So he announces, as a rule to follow, that the length of time arsenic should be left in a tooth must be governed by the amount and severity of the pain. Another serious objection against its use is that it frequently excites more or less inflammation of the pericementum. The recent experiments of Dr. Kirk with coagulants in pulp-canals demonstrate very clearly that whatever care we may take in sealing medicines in the cavity of a tooth, we cannot prevent their exerting more or less influence

on the pericementum. From my experience in the use of arsenic I have deduced a few rules. First, to always make the application in the morning, to allow the patient an opportunity to have it removed in the afternoon if the pain is severe, instead of compelling him to endure the pain during the night. Second, to always make the application to an exposed pulp. I use a piece of blotting-paper, which is saturated with creasote. On this is placed the least possible amount of arsenic, then a little powdered cocaine, and this I cover with cotton and sandarac varnish or wax, using care not to have any pressure on the pulp. This I leave in the tooth from two to three days. Frequently cases present with severe pulpitis, but no exposure. In such cases as these many advocate saving the pulp, relieving the pain by reducing the inflammation, and then filling the cavity. My experience has been that wherever there has been odontalgia arising from any disturbance of the pulp, every attempt to save the pulp has been a failure. In these cases, to apply the arsenic without first exposing the pulp subjects the patient to an ordeal to which I would not submit myself. My personal experience of suffering from such applications has stimulated my search for something better. To expose the pulp in these cases used to be a painful operation, but practised because I believed the temporary pain obviated a long period of suffering.

The process known as "knocking out" answers very well in certain cases, and these are in the anterior teeth having single pulp canals and the tooth well cut away, allowing free access to the pulp. A sharp stick is shaped to go the length of the canal, and with a mallet, by one blow, is driven into the pulp. This method is sometimes a failure as a result of miscalculation of the size of the canal, thus necessitating a second application of the stick, to which the patient is apt to interpose serious objections.

Carbolic acid is sometimes used, applying the crystals to the exposed pulp, cauterizing the surface, then removing the cauterized part, and following with another application of the acid, continuing this way removing the pulp in parts: a very slow, tedious operation for both patient and operator, and attended with more or less pain. A method hardly to be advised, as it offers no advantages over the "knocking out" process.

Cocaine is advocated by a few for the purpose of removing pulps, and as right methods for its use become better known,

the efforts will be more successful. Because of its complete success as a local anæsthetic when applied to the eye we thought it would have an equal effect on the pulp, but our experiments were not a success in the line we had hoped. While we found it did exert an influence, it was not sufficient to allow of the removal of the pulp or of the insertion of an instrument into it. Since then only a few have continued their experiments, and only within the past year has a successful method been brought before the profession. Occasionally items have appeared in dental journals like the following: "To remove the pulp, apply crystals of cocaine and allow to stand ten minutes, when the pulp can be easily removed." Any one who has had much experience with cocaine will give such items very little credence.

A little over three years ago I commenced a series of experiments with cocaine, using the hypodermic syringe and injecting the solution (a four per cent. I find sufficient) into the pulp. Emboldened by success with the first case attempted, I have continued my experiments, and now I do not hesitate to attempt its use in every case. During the past year I have only resorted to arsenic in four cases, the reasons for which I will give later. My method in detail is as follows: if possible I apply the dam, as it is necessary to keep the cavity dry until the pulp has been injected. After drying out the cavity I uncover the pulp, and this is done in an almost painless manner by first blowing on warm air, then an application of a saturated solution of cocaine in alcohol and ether or chloroform equal parts, allowing this to remain about thirty seconds, then another application of warm air, continuing in this way till sensitiveness is wholly obtunded. As soon as the pulp is exposed,—and I only desire to expose a spot as large as the point of my hypodermic needle,—I apply crystals of cocaine and moisten with campho-phenique. After standing thirty seconds I apply warm air for a few seconds, and then attempt to work the crystals into the pulp. In from two to ten minutes I am able to introduce the needle of the syringe without pain. With a quick push I force the needle into the pulp, and it is instantly benumbed, I immediately with burs proceed to open up the pulp-chamber and remove the body of the pulp. As I reach the canals I occasionally find a little sensitiveness, when I have to inject each canal. I then remove the dam, and proceed, with one exception, as I always do in treating a pulpless tooth. First, I have the patient rinse the mouth with a solution of hydro-

naphthol; dry out the cavity and flood it with hydrogen peroxide, and with a Gates-Glidden drill ream out the canals at the same time the drills remove the pulp-tissue, and working the drill in such a manner that the peroxide is always in advance of the instrument. When the canals are thoroughly cleansed I wipe them out, and—this is the exception noted above—I pump into each canal a saturated solution of zinc chloride or carbolic acid, preferring the former. I do this to destroy and render harmless the minute remnant of pulp which it is impossible to remove from the constricted portion at the end of each root. If this precaution is not taken there will be more or less pain after the root is filled. As soon as the influence of the cocaine has passed, sensitiveness returns to the remnant end, and if the canal is filled as thoroughly as it should be, there will be pressure at the end of the canal, causing this pain, which will not subside till the filling is removed. I allow the zinc solution to remain in the canals while I am preparing the gutta-percha points; then I again wipe out the canals and pump in a saturated solution of iodoform in eucalyptol, and immediately press in the gutta-percha points to the end of each canal, and proceed to fill the cavity.

When patients come in complaining of toothache, and the pulp is still alive, if I am able to give ten to fifteen minutes, I proceed at once to remove the pulp and fill the canals. If there is tenderness on pressure of the tooth, showing that inflammation has extended to the pericementum, I give the patient, as I dismiss him, a few capsicum plasters to apply to the gum over the tooth. When I cannot give any time to the patient, I wash out the cavity with warm water, moisten a pellet of cotton in creasote and oil of cloves,—equal parts, sprinkle on a few crystals of cocaine and seal in the cavity. This generally gives instant relief, and I endeavour to attend to the case within the next two days.

The question will be asked, Is this method of removing pulps a painless one? I answer, Yes and no. In the majority of cases it is painless, but with some there is a little pain. In the four cases referred to above I was not able, after trying for fifteen minutes, to enter the pulp,—three of these teeth were inferior third molars,—so I resorted to arsenic.

The pulp of a tooth is composed of blood-vessels and nerves. It has a special sensory function, and while it does not have the tactile sense, it has the sensory function highly developed,—as much, if not more so, than any other organ in the body.

While to a touch it responds quickly with a shock of pain, it is seldom that a person can correctly locate the tooth from which the pain proceeds, thus showing the decided difference between the tactile sense and the sense of pain. Words fail to describe the intense suffering produced when an exposed pulp is only slightly touched, therefore in all operations on the pulp the operator should constantly bear this in mind. To remove pulps in the manner just described requires judgment and patience; needless suffering will ensue in any attempt to hurry. Within the past two years I have removed nearly one hundred and fifty pulps by this method, and in only one case did I have to remove the filling in the canal, in which instance it was in the left superior cuspid of the writer and this because I neglected to apply the zinc chloride after reaming out the canal. Naturally, my personal experience of the entire absence of pain while injecting and removing the pulp from this tooth carries more weight, in my own mind, as to the painlessness of the operation, than the testimony of all the other patients operated on.

The Dental Cosmos.

CASE OF COCAINE POISONING.

By E. N. NASON, M.B. Cantab.

A trained nurse twenty-nine years old, in order to test a solution of hydrochlorate of cocaine which was supposed to have lost its strength, injected into her arm twenty minims, which contained five grains of the alkaloid. Almost immediately afterwards she began to feel cold, but not knowing that cocaine had any but a local anæsthetic effect she did not attribute this to the injection. This was about 2.30 p.m. Half an hour later, it being her bedtime, as she was on night duty, she went to bed, remarking that as she felt cold she would have a hot bath before retiring. She remembers trying to get to the bath room and feeling that the effort to do so was very great, and that she had considerable difficulty in breathing. After this she remembers nothing more until next day. Some little time later—possibly twenty minutes—she was found lying upon the floor in the passage leading to

the bath room. She was then only partially conscious. Her extremities were cold and her pulse feeble. There was no marked pallor, no sweating, and no sickness. The respiration was very shallow and jerky. Her eyes, the pupils of which were much dilated, had a fixed and absolutely vacant stare. On being conveyed to bed her extremities soon became warm and her pulse nearly normal, but she could not be made to lie down and persistently assumed a position in which she rested on her left elbow and stared fixedly at the wall or ceiling without appearing to see anything. An attempt was made when she was first found to get her to swallow some stimulant, but this she seemed quite unable to do. She remained in this dazed and vacant condition, occasionally saying "it is cold," but unable to answer any questions except by "yes" or "no," which were evidently used at random and always after a long interval, until 1 a.m., when she fell asleep. She slept for a few hours, and then woke up feeling very sick, giddy, and weak, but with no recollection whatever of what had taken place after her attempt to reach the bath room on the previous day. The condition of nausea and weakness lasted for several days, and then gradually passed off. I should add that there was nothing hysterical about the patient, who is a most capable and sensible woman.

The Lancet.

ON DOUBLE HEARING.

Dr. Hans Daae, of Christiania, has written on this subject. The cause of double hearing has frequently been discussed. Cases have been reported in which the cause was situated in the middle ear; rupture of the tympanic membrane causing double hearing, which disappeared when the rupture healed—others in which the mischief was in the internal ear, such as from fatigue of the perceptive portion of the auditory apparatus from long-continued use of the telephone; and other cases have been due to central disturbances.

Dr. Hans Daae reports three cases, in two of which treatment directed to the abnormal state of the middle ear sufficed to remove the disagreeable symptoms of double hearing.

Glasgow Medical Journal.

Reports of Societies.

MANCHESTER ODONTOLOGICAL SOCIETY.

The usual monthly meeting of the above Society was held on Tuesday evening, the 4th December, 1894, at the Grand Hotel, Aytoun Street, Manchester. Mr. W. Dougan, the President, in the chair.

DISCUSSION ON THE DEMONSTRATIONS PERFORMED AT THE PREVIOUS MEETING.

Mr. DAVID HEADRIDGE said that the great merit possessed by the Weber-Perry engine used by Mr. Hooton in his demonstration was certainly brought out to the full—namely the direct application of the power to the hand piece. Mr. Harrison's demonstration was also interesting and there was a little novelty in the way in which he used the articulating paper by having the holes "punched" in it with a rubber-dam punch. He was very much in favour of using Logan crowns.

Mr. MURPHY said that since seeing Mr. Harrison's demonstration, he had used the articulating paper in the manner described with great success.

Mr. WHITTAKER said he had not used an engine similar to the one used by Mr. Hooton. It certainly worked well, and the filling he put in was beautifully finished, but he thought results equally as good could be obtained by using other mallets besides the Bonwill. A great deal depended upon the skill of the operator. He preferred the electric mallet for constructing contour fillings. He thought the gentle way in which Mr. Hooton handled his patient was worthy of every praise, and formed an admirable example for the students to imitate. In regard to Mr. Harrison's demonstration, although he had fitted a few Logan crowns himself, he was not at all sanguine as to their durability. He thought that in fitting a Logan crown they ought also to have a gold band fitting round the root. That was done at a demonstration at the Newcastle meeting, and it was certainly one of the most perfect specimens of Logan crown work that he had ever seen. It took longer to do, but it had the great advantage of durability.

Mr. COLLETT said he was entirely at one with Mr. Whittaker in his remarks on the Bonwill mallet. He was not particularly in love with it, and thought the beautiful result obtained by Mr. Hooton was due quite as much to his skill as to the mallet. He did not quite agree with what Mr. Whittaker said about the lasting qualities of the Logan crowns. His attention was first turned to these crowns by having a patient some years ago who had had one of them in for over twelve years. It was a right central, but unfortunately during her stay in Manchester she smashed the crown and came to him (Mr. Collett) to have another put in its place. The porcelain was entirely gone, leaving the post exposed to view, and an examination showed that there was not the slightest sign of decay. It took him over half an hour to drill the post out. With such a striking example of their durability, he determined to go in for fitting Logan crowns, and had since done so very extensively. Personally he thought that if the Logan crown was put in with ordinary care it would last much longer than the ordinary gold pivot. He also thought Mr. Harrison's method of punching holes in the articulating paper was very good.

Mr. G. G. CAMPION said that any remarks he might make would be given with some diffidence because of the fact that he was not present at the demonstrations. Incidentally he might say that the President some years ago gave them a most useful and valuable demonstration on the insertion of a Logan crown. He could support Mr. Collett as to the value of these crowns. He had himself met with the same difficulty in drilling out a Logan post when a crown had been broken. To anyone who had no experience of this class of work there would probably occur this objection, namely, that the junction of the band and the root being made of cement, the latter would be liable to be dissolved away, the natural consequence being that the root would very soon decay. From his experience however, he thought that was an objection which was very much less than it appeared at first sight, because if the crown was perfectly fitted to the root, the amount of cement was so small as practically to be of no moment. Of course, that all depended on the accuracy of the fit, and the fit might be made more accurate by using the articulating paper after Mr. Harrison's method. The question arose however, whether it was better to fit the crown direct, or to first fit it on a model. He believed in the latter way, because he found it saved him time in the consulting room. If a

model were taken with Godiva, the surface of which had been heated in the flame of a spirit lamp, they got an exceedingly sharp impression of the root, and the plaster model was very much better than any they could get by using Godiva in the ordinary way, or any similar material. If when they had got the impression, they pressed some Sullivan's amalgam into it, previous to obtaining the usual model they got a plaster cast of the root, the surface of which was made of amalgam, and they could then fit the crown down to that without fear of "rubbing" the impression. That was a great gain, for he had found that in adjusting crowns so constructed, they wanted no touching up at all, and the crown could be fixed immediately.

Mr. RENSCHAW said he had not as yet used the Logan crown. He thought the Bonwill crowns were extremely useful when the patient had a very short "bite." Only a week ago he saw a Bonwill crown which he had put in 5½ years ago. In the first instance he fixed it in the ordinary way by fixing the post in the root with amalgam, and filling the cavity also with amalgam. In about two weeks, however, the whole thing gave way. The crown was so short and the amalgam had not sufficient power to hold the crown fast round the pin. He eventually adopted the following plan: He got a gold headed bolt such as they used in the construction of a swivel, which he cut short enough for his purpose, and then cemented the whole thing on with amalgam. Upon examining the crown the other day he was pleased to find that it was as firm and rigid as the day it was put in, and seemed likely to last many years longer. The mercury in the amalgam had had no ill effect on the gold.

Mr. P. HEADRIDGE said that from what he saw of Mr. Harrison's operation he left the neck of the root standing on the lingual side about a line beyond the gingival margin, and so ensured the stability of the cement. If the joint was below the margin of the gum there was every opportunity for acid secretions to lodge and inevitable decay would result.

Mr. W. A. HOOTON, in reply said that from his experience of the Weber-Perry engine he had found it more useful in driving the mallet than the bur. Personally he thought it unsuitable for the latter object. For most purposes where cohesive mallet work was required he thought the electric mallet was more desirable than the Bonwill, but he was quite sure from what he had seen of the latter instrument as used by others that it was a very valuable addition to the means

at their disposal of doing cohesive work. In conclusion he could only thank them for the kind way they had thanked himself and Mr. Harrison for their demonstrations.

DISCUSSION ON THE PRESIDENT'S INAUGURAL ADDRESS.

Mr. H. PLANCK said that Mr. Dougan had commenced his paper by saying, "It appears to be tacitly admitted by nearly everyone, that the teeth of the present generation are wofully inferior to those of, say, 50 years ago," and then he had proceeded in a most admirable and powerful way to combat that view. His principal line of argument being that in view of improved water and food, and the lengthened years and strength of the present generation, the theory that teeth were deteriorating was untenable. It was a question, moreover, upon which many differing opinions were held, and one which had often been discussed with a view of finding a remedy for the supposed deterioration. The whole subject was summarised most admirably in the concluding paragraph of the address, that "At the present time we have no actual proof that the teeth are either better or worse than they were say fifty years ago, and until we get the results of careful and systematic examination of the teeth of school children, extending over a great many years and embracing all classes of society, it seems to me only a waste of time to frame theories to account for something which we do not know to exist." If they were to deal with the subject in a thoroughly useful and systematic manner let them be quite sure, as a profession, that teeth were deteriorating before they wasted time in seeking a remedy. If they found the teeth were deteriorating, they could find out the cause of the decay and also the remedy. In his opinion the teeth of the population, particularly those of the work people in the North of England, were deteriorating in a most terrible manner, but whether their teeth as a nation were deteriorating was another question.

Mr. E. LUND said he felt some hesitation in taking part in the discussion as he was only there in the capacity of a listener, but he would do so with pleasure for two reasons. The first was that he had thought over the subject, and the second was because he had had an opportunity of perusing Mr. Dougan's address which he did with great interest, as the subject was handled in a very clear and simple manner,—the statistics especially being given in a very readable form. He had not, of course, the precise knowledge of dental matters as those

whom he was addressing, but looking as he did upon the teeth as a test of health, it was in that direction that the dentist could often give a hint to the medical practitioner. That being the case, it seemed to him that it would be very desirable if they could in any way "work out," as it were, some method of investigation by which they could discover some of the general causes for the universal carious condition, if it were so, of the teeth amongst the people of England. He had read a paper issued under the authority of the British Dental Association, giving the results of an exhaustive enquiry into the condition of the teeth of the children attending various schools. He thought however, that they should begin, as it were, at the other end of the subject, that they should make a record of all the perfect sets of teeth they could find amongst the whole population throughout England. His next idea was, assuming that to be the right way to approach the subject, that this Society, in conjunction with the central Society in London, and the others in the provinces, should come to some agreement to keep a tabulated record, to be circulated among the dentists of Great Britain generally, asking them to mark down every case they met with of a perfectly normal condition of the teeth, say, in people between the ages of 15 and 25 years, during which period the teeth developed fully. Supposing they supplied 500 dentists with these blank forms, well, if they got 10 per cent. filled up and returned the first year, those could be put on one side, and so on with every succeeding year, during which, in all probability the percentage and returns would increase. In that way they would have a complete history as to why those teeth were so well developed. One of the first points they would have to refer to would be that of heredity. They must enquire into the general condition of the teeth of all the members of the same family. They might extend that enquiry to those of the cousins, as well as the brothers and sisters, and parents. It would be as well also to enquire whether the person with a normal set of teeth was fed as a child on its mother's milk or artificial food, and if the latter, what was the kind used. One great gain would be the uniformity of the reports. His scheme was upon the same basis of that of Mr. Hart of the *British Medical Journal*, who sent out a series of enquiries as to the advance of cholera in India, and by that means he brought together a more valuable series of replies than even the Government enquiry. The same thing had been done in regard to the opium question. Let them find out, if possible,

how it was that a certain number of persons had very good teeth. It would be much less labour in the long run than a record showing what number of the population had bad teeth. He thought the universal application of the tabulated form would be something more valuable and less wasteful of time than the present system. Instead of noting the failures let them find out the successes.

Mr. DAVID HEADRIDGE said he thought Mr. Lund's suggestion was a very practical one, and one that would not entail any great amount of trouble or expense. In conjunction with Mr. G. G. Campion he had drawn up the Manchester reports of the Schools Investigation Committee in connection with various industrial schools, and with all their work he thought the results—especially as to the value of the statistics,—were unsatisfactory. He certainly thought the statistics on some such plan as Professor Lund's would be more valuable, because they would learn something of the causes which were undermining the teeth. It was in his opinion at least open to dispute whether the average longevity of life had increased, because although insurance statistics might furnish certain data in support of the contention, still he thought that might be partly due to the greater "bolstering" up of people through increased medical skill. He certainly did think from what little experience he had had that there was a great deterioration of teeth going on. They knew that the health of infants in towns especially was very low during the time the teeth were forming and erupting, and it was during that time that the irregularities and deterioration of the teeth took place.

Mr. PLANCK asked whether anyone could doubt, taking the official tables of mortality as a guide, that the relative ages of the English race were increasing. Take, for instance, Manchester, whose death-rate was formerly 27 per 1,000, and was now less than 21 per 1,000.

Mr. D. HEADRIDGE said that only seemed to prove that more people attained an average age of 30 or 40, but that there were not so many people who lived to a great age.

Mr. SIMMS said it seemed to him that Professor Lund's suggestion was a very excellent one if it could be carried out. It should, however, be remembered that the people with perfectly developed and healthy teeth rarely come in contact with the dentist. It was therefore a question to what extent the dentist would be able to supply the information desired.

Mr. G. G. CAMPION said he wanted to say a few words in

the first place with regard to Mr. Lund's remarks upon the statistics which had been given and which were being obtained now from school children. Mr. Lund implied in his speech that the investigation was undertaken with the object of ascertaining something with regard to the nature and the cause of caries. That was not the whole, nor the main object, and so far was that investigation from being completed, that he thought it was really only now beginning to have its effect, and that more research of that kind would have to be undertaken if it was to have the effect it was intended to have. Because it was not, as he believed, undertaken so much with the idea of learning something of the causes of caries as to demonstrate to those in authority that the health of children attending the elementary schools would be distinctly improved if their teeth were properly attended to. Mr. Lund had just told them that he had taken great interest in the relation of teeth to the general health of the body. It was also equally true that the condition of the teeth re-acted upon the general health; and it was from that point of view as much, if not more, than any other, that these investigations as to the condition of children's teeth were undertaken; the object being to show the Government and the people in authority that it was really of advantage to the health of the children, that their teeth should be looked after much better than they were at present.

Mr. P. HEADRIDGE said that he agreed with the paper as a whole. He was not inclined to dogmatise or to take one side or the other. When he was asked by parents, as often occurred, as to the best course of treatment they should follow in order that their children should have good teeth, his advice to them was to keep the children as healthy as possible, by letting them have plenty of fresh air. It was no use giving children lime unless the system could assimilate it. If the body was healthy they were more likely to have good, sound teeth.

The PRESIDENT in bringing the discussion to a close stated that his address contained no dogmatic statement on one side or the other. His purpose was to raise the whole question, and to point out how far we were removed from adequate knowledge on the important subject.

Professor Lund then read a paper, which we publish on page 145.

At the conclusion of the paper, the President proposed a vote of thanks to Mr. Lund and said that if he had been

practising dentist for the last fifty years, he could not have dealt with the subject in a more able manner than he had done.

The motion was seconded by Mr. Planck, and agreed to amid applause.

Dental News.

NICE POINT OF LAW.

At the Resident Magistrate's Court at Cape Town, in November last, before Mr. J. C. Faure, R.M., James Dowers dental mechanician, was charged with having wrongfully and unlawfully absented himself without lawful cause from the premises of his master, Zebulon Goodman.

Mr. O'Dowd for the plaintiff, defendant by Mr. Shaw.

Alfred Field, qualified dentist, said he was manager of the London Dental Institute in Greenmarket-square, of which Mr. Goodman, the plaintiff, was the financier. He had complete control over the employes. Defendant came out from England under the agreement put in and entered on his duties. In the agreement he was described as a "mechanical-dentist," and as such required no diploma or registration. His duties were to make artificial teeth. He remained for several days in active service, and then absented himself without lawful cause and was absent still.

Cross examined :— A Mr. Goodman was the proprietor of the London Dental Institute, whose Christian name he did not know. He was witness's employer, and employed witness at a salary. He had drawn money on account of his interest in the business. Mr. Goodman left a week ago for Johannesburg. Defendant asked witness whether Goodman was a dentist, and he replied that he did not know. He did not tell the defendant that he was going to get his pickings out of the business and then clear. He (witness) was a registered dentist, but held no diploma.

Re-examined :— He practised and was registered as a dentist in England for seventeen years. A diploma was not necessary when he was registered. The compulsion came in 1878. Mr. Goodman represented the London Dental Insti-

tute in South Africa. The Institute had branches in the United Kingdom, Canada, and Australia.

By the Court :—He could not say when or where the word “dentist” after the name of “Goodman” was struck out in the agreement put in.

John Baker, Secretary in Cape Town of the London Dental Institute said that Mr. Goodman was the capitalist who found the money to run the place. He took no active part in the management of the business. He remembered a conversation about the stability of the institution, and Mr. Goodman satisfied defendant that in the event of the venture not proving a success he would pay him three months’ wages and his passage back to England. A rider to this effect was put on the agreement, to which the defendant agreed.

At this stage the Magistrate said that the interpretation clause of the Act did not put down an assistant as a servant, and he did not see the use of going on with the case.

Mr. Shaw said he had a particular reason for going on with the case. The Masters and Servants Act did not apply in this case. A servant who came out under a contract was defined as a person who was employed for hire service in agriculture or manufacture. The defendant was a man who did not make false teeth, but having the necessary training could fit the teeth so that they were of use to the dentist. He was a dentist’s assistant, and a gentleman within the meaning of the Act, and could not be held to be a servant.

Mr. O’Dowd pointed out the interpretation put upon dentist” in section 3 of the Medical and Pharmacy Act. They could not go to the length of saying that the defendant was a dentist. A servant was described as a person working for hire to perform handicraft or manufacture. The defendant was a maker of false teeth and if that were not manufacture he did not know what was.

The Magistrate said he would let that point abide for the present. The case would proceed.

Cross-examination continued :—He was not a dentist ; he was a broker.

Henry Ralph Arderne, of the firm of Messrs. Fairbridge & Arderne, said he remembered the plaintiff and defendant coming to him separately about the rider in the agreement. The defendant said he was willing to sign the rider if he could get the money instead of the passage home, as he would perhaps, prefer to go to another country. Goodman

subsequently consented to the alteration but defendant never returned to sign.

Cross-examined :—Some correspondence subsequently took place in which witness stated that the description of Goodman as a dentist was a mistake in the contract.

This closed the plaintiff's case : for the defence,

Dr. Berks Thompson Hutchinson, registered and qualified dentist, said that the plaintiff was not registered as a dentist. The defendant was what is ordinarily known as a dentist's assistant. The duties he was performing would be part of the curriculum of a man wishing to qualify as a dentist. If a man like the defendant served a man describing himself as a dentist who was not, such as in this case, it would be considered unprofessional conduct, and he (witness) would hesitate before giving him employment subsequently if the defendant applied to him.

Cross-examined :—The manufacture of false teeth would not qualify a man as a dentist. The manufacture of teeth was carried on by the million in large factory ; the science came in in fixing the teeth to the shape of the mouth. He believed that the defendant was hired to do high class work. He believed that the Institute was a perfect swindle, and would like to give evidence on that point. He had a strong opinion on the affair (laughter). It was a bogus affair in his opinion and ought not to be allowed, if he had his way he would expose the whole affair. Mr. Field told certain people that he could not fit in teeth and was waiting for his assistant (the defendant). He knew nothing about the defendant's leaving his employment, and had nothing to do with it.

George Noel Lindup, dentist, said he had been practising since 1874, and his father practised all his life. He would not engage the defendant after serving the plaintiff under the existing circumstances. The defendant should be making progress under his employer, but if his employer were not competent he would be losing ground.

Cross-examined :—He thought that very low class work must be done at the Institute. His reason for saying this was that their method of carrying on business leads to a system of "cover." He meant by "cover" a system by which a thing may be run commercially but not professionally.

Robert James Barclay, dentist, said he agreed with the evidence given by the two previous witnesses. Defendant would be prejudiced by working at the Institute under a

qualified manager if he worked on the lines of the advertisement, by turning out cheap teeth, as good work could not be done for the prices advertised.

Frederick Thomas Abbot, dentist, gave similar evidence.

Cross-examined :—There were companies all over the world who bought up old sets of teeth, and worked them up again. These were generally sold at a guinea a set. A set of teeth could not possibly be turned out for a guinea. He had not seen any of the work turned out by the Dental Institute ; he did not know that they had turned out any work at all up to now.

James Dowers, the defendant, said that at the time he entered into the agreement he believed the man Goodman was a dentist. After his arrival in the Colony he discovered Goodman was not a dentist, and taking legal advice left the premises, and was now instituting an action against Goodman.

Cross-examined :—He did not know the “Dental Institute of London.” He worked at the Greenmarket-square place for about ten days. He had no reason to believe that Goodman was not a dentist for the first few days. He worked under Goodman. Field was the manager of the surgical part of the place, but witness did not consider he was working under Field. He absolutely refused to sign the rider on the agreement. The place could not be called well equipped ; the appliances had not yet arrived.

By the Court :—It was his intention to qualify as a dentist.

The Magistrate said that the only point that remained was whether the defendant came under the Masters and Servants Act.

The agents having addressed the Court,

The Magistrate said he had very great doubts as to whether the defendant came under the Master's and Servants Act. He did not think he did. It was not contemplated in the clause that work of the nature the defendant was employed to do should make him liable to be classed as a servant. Under clause 5 of the agreement it appeared to be very clear that the work was of a much superior nature than a mere servant would be put to do. The case would be dismissed.

Mr. Shaw applied for costs, but the Magistrate dismissed his application.

BEESWAX OR PARAFFIN.

At Bristol Police Court, recently, several summonses were heard under the Sale of Food and Drug Act. Among them was one for selling to Thomas Thompson, an inspector under the Food and Drugs Act, a pound of beeswax containing 60 per cent. of paraffin. The inspector spoke to purchasing the wax on December 10th, and paying 2s. 6d. for the same. The analyst had certified that it contained 60 per cent. of paraffin. Mr. Cross, representing the defendant, affirmed that his client bought the beeswax as pure from a wholesale druggist in Bristol, who had purchased it from another druggist. They had reason to doubt the analyst's certificate, as a rough examination of theirs showed nothing like 60 per cent. of paraffin. It was the custom of the beekeepers to put a foundation of common wax at the bottom of the hive, which would account for the smell of paraffin. He therefore asked that the case might be adjourned in order that a sample might be sent to Somerset House. The Bench granted the adjournment.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
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British Journal of Dental Science.

No. 651. LONDON, MAR. 1, 1895. VOL. XXXVIII.

A METHOD OF STRENGTHENING VULCANITE PLATES.*

By CHARLES R. MORLEY, L.D.S. Eng.

Mr. President and Gentlemen,—The subject I wish to bring before your notice this evening, is a method of strengthening vulcanite plates, or more correctly, a method of making plates, using vulcanite as a means of attachment for the teeth, and of gaining the fit to the mouth. I feel I am writing about a subject which would have been much more ably and fitly brought before this Society by my father, Mr. Morley, of Derby ; for the particular forms of angle plates, and methods of working I bring before you, are the result of his experiments, and to him therefore the whole credit belongs.

Some of the advantages attending the mode of construction referred to are, an equal thickness of plate, entire absence of spring or warp, together with thinness, lightness, strength, and great rigidity ; by reason of which pieces seldom break from the masticating strain.

I think it will be convenient to divide the subject into two parts :—(a) The strengthening of edentulous uppers ; (b) the strengthening of partial uppers.

(a) Having prepared the plaster model in the usual way,

* Read before the Manchester Odontological Society.

prove it to be correct, and then proceed to set up the teeth as for a plain vulcanite upper, try the plate in the mouth to see that the bite, position of the teeth, etc., are correct ; then place it on the model and take plaster impressions of the fronts of the teeth. Having obtained these, take the temporary plate to pieces, and fasten the teeth in the fronts with a little wax, and we now have the relative positions of the teeth and model to each other. If it should be necessary to ease off the finished plate down the centre of the palate, where the two halves of the superior maxillæ join, take a strip of Ash's soft metal of the size and thickness required, burnish it to the model and wax in place. Now, take a zinc die and strike up a copper plate No. 2 in thickness, a little larger than it is intended to make the vulcanite plate. Upon this copper plate strike a perforated dental alloy plate, No. 7, and over this a tin plate, No. 10. The dental alloy plate and the tin plate must each be smaller than the copper plate. The dental alloy plate may sometimes turn comfortably over the ridge of the jaw but more often running round the alveolar border a little within the palatal aspect of the teeth, as shown by the fronts, and the tin plate will be of such a size as to clear the angle and all the teeth. Round the perforated dental alloy plate, under, or a little within the pins of the teeth, a strip of strong plain dental alloy plate, should be soldered at right angles. I usually make the perforated plate about three quarters of an inch wide, and to extend from the first molar to the first molar ; the bar may be prolonged to a point between the pins of the first or second molar, so that the metal plate does not end opposite the division between two teeth.

We now have on the plaster model, first a copper plate, then a strengthened, perforated dental alloy plate, and over this, a tin plate covering the palatal portions of the above plates, Upon this base, wax up the teeth to the same extent as if

you were attaching teeth by means of vulcanite to a gold plate, because the palatal portion is formed by the copper, dental alloy and tin plates and no wax must be allowed there. Proceed to flask, using a three part flask. One part will contain the model, the centre portion the teeth, and the third section the plug, Before separating the first and centre parts of the flask, it will of course be necessary to wash away all the wax. You will note the three part flask is necessary to enable you to take away the copper plate. The packing is very important. In the first case, i.e., where the plate turns over the ridge, it will be necessary to pack from both sides, packing the palate side first, then closing the flask with the tin plate in position, then open the the plug portion and complete packing. In the second case, bolt together the portions of flask containing the model and teeth, having previously if you like, packed a little rubber between the teeth labially.

In another case where the front teeth are fitted upon the gum, and it is intended to use a two part flask, covering in the teeth, all the plates must be reduced in size by cutting them clear of the backs of the teeth, in order that they may lift out of the flask.

Cut a piece of rubber the shape of the perforated plate, but smaller, and squeeze it out very thin between two pieces of linen put between two strips of tin under the screw press, and line the palatal side of perforated plate with this. Place on the model and close the flask with the tin plate inside. Now heat up the flask and very carefully close right home. My father uses a circular bicycle spring in a screw press for this purpose, but, personally, I have found boiling the flask and the ordinary screw press, used with much caution, satisfactory.

If the above directions have been properly carried out, we have the perforated plate in the same position on the model

as before, only the copper plate is replaced by vulcanite. We now open the plug portion of the flask, take out the tin plate, finish the packing and vulcanize in the usual way.

In finishing, care must be taken to remove as little vulcanite as possible or else you will get the perforated plate shewing.

(b) The method of strengthening partial uppers is in a great many ways the same as for full uppers ; but instead of using the bar at right angles, I have found it much more convenient to strike upon the perforated plate a piece of plain Dental Alloy plate No. 8, about an eighth or a quarter of an inch wide. This plate runs round the labial edge of the perforated plate and is soldered solid to it. It is advisable to leave a space of about one-sixteenth of an inch between the necks of the natural and the heels of the artificial teeth and the strengthening plate. In some cases it is an advantage to back some or all of the teeth and to solder them on to the strengthening plate, and also the clasps. This can be done quite satisfactorily, but great care, especially where the artificial teeth fit on the gum, is necessary in the flasking and above all in the packing and closing of the flask. If the latter process is carelessly carried out we may have failures ; such as the teeth not fitting on the gum, the bite being raised, etc. Occasionally I have had a tooth cracked, which is, as you all know, a most annoying accident. Where the teeth, clasps, (if any) and plate are all separate it is only necessary to use a two part flask unless the bite is very shallow and you cannot pack through under the teeth. Where the teeth, clasps and plate are soldered together you will be again obliged to use a three part flask; the teeth, plate, etc., being in the middle section. You must pack from both sides, lining the palatal side of perforated plate with thin rubber. Gently close the flask by hand, and the tin plate being in position heat up and close right home. Before opening the flask bolt sections 1

and 2 together,—i.e. the portions carrying model and teeth—then remove the plug and tin plate, and complete packing.

Tin plate and rolled copper can be obtained from Stanton Brothers, 73, Shoe Lane, Fleet Street, London, E.C.

Now, gentlemen, you must allow me to thank you for your patient attention, and to say I am sorry if I have wearied you by going so fully into minute details, but my great object has been (even at the risk of appearing as an instructor to practitioners older than myself,) to make the subject as plain as possible, and if I have succeeded in this and induced any member of this Society to try the above form of angle plates, I am content. In conclusion, I wish to lay particular stress on the right angle as the novel feature in the process I have described, for I am perfectly aware that plain perforated plates are many years old.

DENTAL MECHANICS. DENTAL LABORATORY.

By HARRY ROSE, L.D.S. Eng.,
Lecturer on Dental Mechanics, National Dental College.

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Continued from page 166.

MATERIALS FOR TAKING IMPRESSIONS OF THE MOUTH, AND THEIR RELATIVE VALUES.

Beeswax. The product of the honey bee, melted down, freed from impurities, and cast into a mould.

To prepare it for dental purposes it should be remelted in a vessel suspended in boiling water, and then poured into a plaster of Paris mould, previously damped. This is to form it into thin sheets, and the object of so doing is that the wax

may be readily softened without using the water too hot. White wax is the above, after undergoing a process of bleaching.

Plaster of Paris. This is the name given to Gypsum when ground and used for taking casts. Gypsum is an exceedingly abundant substance, and is met with in a great variety of forms. When in a crystallized condition it forms prisms of great transparency and symmetry, and in this state it is called Selenite. The crystals are sometimes massed together in bundles, or radiate from a centre, and a variety of this from its lustre is called Satin Spar. When in uniform, saccharoidal, translucent masses it constitutes Alabaster, and it is found besides in large beds or rock deposits, constituting ordinary gypsum.

The appearance of the different species of this substance varies greatly, the purer kinds are translucent, or transparent, with hardly any colour, the commoner kinds are opaque, and the colour varies from white and pale yellow, through red to brown, and black and blue gypsum are also known.

When heated, water is expelled from the gypsum, but if the temperature has not been too high, it retains the power of recombining with it, but if heated to a high temperature it passes into the state of anhydrite.

Gypsum in large quantity is usually met with in the salt and coal deposits, but it occurs in beds in large aggregations, and in thin seams and fibres in all kinds of rocks. One of the most important is the deposit at Montmartre, Paris, but it occurs abundantly in this country, and in other parts of Europe and America.

After the gypsum has been calcined and ground, if mixed with water to the consistence of thick cream, it hardens in a short time and acquires great solidity; during the process of consolidating it expands in consequence of the absorption of the water by the particles of plaster.

There are several grades or qualities of plaster made, known as coarse, fine, superfine, and extra superfine. The two best should be used for our work. To ensure a hard model, the plaster should not be mixed with an excess of water. The thicker the plaster is mixed, consistently with its thorough incorporation with the water, the harder the resulting model. The plaster hardens more rapidly with hot water than with cold.

The addition of borax or alum makes a model that is considerably harder than the plain plaster, but it is not desirable to add these materials where the cast has to be used for vulcanite work.

Gutta-Percha. When quite pure Gutta Percha is of a greyish white colour, but that sold commercially is usually of a yellowish or reddish-brown colour. It is the concrete juice of a tree called the *Isonandra Gutta*, and is found in the forests of Malay, Sumatra, Borneo, and adjoining islands.

It was formerly obtained by cutting down the tree, but it is now procured by surrounding the trunk of the tree with a ring of clay with elevated edges, to form a receptacle. An incision is then made above in the bark, and the milky juice at once exudes, and is collected in the clay reservoir. This juice by evaporation yields a pellicle which forms on the surface like cream does on milk, and the pellicle is renewed after removal.

These strata laid one upon the other form layers of greater or less thickness, and constitute the crude article of commerce.

Gutta Percha is used for a number of purposes in dentistry. In its perfectly pure state such as we find in Truman's gutta percha, it may be used as a lining for dental plates, when we have a patient with extremely tender gums.

It is also prepared at the depôts for taking impressions of the mouth, and is then incorporated with some such material

as oxide of zinc or magnesia, and a pinkish colour given by vermilion.

It forms also the principal ingredient in various filling materials.

The Compositions.—These materials, although in extensive use among dentists, are to all intents and purposes “trade secrets,” therefore their ingredients and proportions can only be surmised by the uninitiated. However, one may perhaps say that French chalk, stearine, and gum Dammar or Kowrie play an important part in their manufacture.

Before drawing the reader’s attention to the relative value of impression compounds, it is as well that we should have some idea of the kind of material necessary to fulfil our requirements, not only with satisfaction to ourselves but also to the patient’s comfort.

Firstly,—It should soften at a fairly low temperature, and harden rapidly in the mouth, so that the chances of dragging, or displacement, are reduced to a minimum, or avoided altogether.

Secondly,—It should have a putty-like consistence, free from elasticity, and should adhere or stay to the place it is pressed against, and accurately copy any surface.

Thirdly,—It is desirable also that it should be of an agreeable colour and taste.

Fourthly,—That it should contract rather than expand during the process of hardening, so that a clearer and better impression is obtained.

The above qualifications will meet the description of the material we want, and the nearest approach to it that the author has found is the composition known as A 1.

The following table will guide us in our estimate of the materials mentioned for taking impressions of the mouth.

Time takes to harden.

Plaster of Paris, mixed with cold water	5 minutes.
Ditto mixed with warm water	4½ „
Gutta Percha	8 „
Stent's Composition	4 „
A 1 ditto	4 „

It will thus be seen that Stent's and the A 1 Composition come out best in point of saving of time. The A 1 has the advantage that it is not so elastic as Stent's, and has not the slightest tendency to roll. It does not, however, present so pleasing an appearance as Stent's, but that is a quality that can be dispensed with ; it likewise softens at a very low temperature and appears to contract on cooling.

This latter quality can be readily demonstrated by taking an impression of one's own mouth, as when the Composition begins to harden it seems to grip the gums more and more forcibly until it has quite solidified.

Since writing the above, the number of the Compositions presented to our notice has considerably increased, and in order to make a selection of an impression compound we must be guided by the manner in which it fulfils the requirements previously mentioned.

HOW TO USE BEESWAX.

Take a sufficiency of the wax in thin sheets, and soften in water at a temperature of 150° Fahr., or just enough to bear one's fingers in. When soft it should be kneaded free from lumps and formed into a roll. The impression tray having been previously heated by placing it in the hot water, the roll of wax is pressed into it and adheres to it firmly. It is now ready to take the impression of the mouth. Those who have had any experience in the use of wax, and have worked to the models obtained by its means, must have discovered that the plates made to such models, though fitting the same accurately,

yet when placed in the mouth, stand away, or do not lie close to the palate.

What is the cause of this ? It is that soft wax has a tendency to roll away from the place it is pressed against, and this rolling away cannot be properly controlled unless the impression tray fits the mouth with such accuracy that the wax is as it were imprisoned and is thus prevented from exuding while it is under pressure. Again, wax does not get sufficiently hard in the mouth to allow of its withdrawal without dragging.

In edentulous mouths, more especially in the upper jaw, this dragging is fatal to the correctness of the model, for in such cases the wax adheres so very firmly to the palate and gums, that on exerting force to part it, the impression is drawn out of shape, and of course its value as such is lost. Many devices have been suggested for overcoming this dragging, such as having trays perforated, through which the wax might be pierced, in order to allow air to get in between the wax and the palate, and thus facilitate its easy withdrawal ; but in most cases this has proved far from satisfactory. One might safely affirm that it is almost impossible to get two wax impressions exactly alike. If wax is used the impression tray should approximate as closely as possible to the mouth.

When taking an impression of a mouth in which natural teeth are present, the wax should be pressed against the teeth in order to get as accurate a copy as possible of such teeth, and notice must also be taken of the slant of the same in order to withdraw the impression with the least amount of resistance.

The only operation in the mouth that one would recommend wax for, is the taking of temporary impressions, and only because it is the least objectionable material to introduce into the oral cavity.

PLASTER OF PARIS.

We must now give a more extended consideration to the material above named, because by many dentists it is believed to be the only material that should be used for this important operation, and with which alone a perfect impression can be obtained. Now, what is meant by a perfect impression may be misconstrued ; we may have a perfect impression, and still have a bad, or in other words, a loose fit. When plaster is inserted in a tray, and pressed into its place in the mouth, being soft, it exercises no amount of pressure on the gums and soft tissues, but copies both without displacing them. When hard and plaster is cast into it, a foreign body in the shape of soap is introduced between the impression and the subsequent model, tending to destroy the sharpness of line of any irregularities of surface ; and one has in the subsequent model what appears to be a slight enlargement, making, when the case is finished, a loose fit.

To illustrate better what is meant the author would mention the case of a patient who, at the time of her visit, was wearing a vulcanite upper and complained of its being loose and falling down. When an impression of her mouth was taken in A 1 composition she stated that the previous impression was taken with Plaster of Paris. A new case was made for her, and it fitted her mouth far better in every respect, than the case she had been wearing, and which had only been made a few weeks, and which appeared (with the exception of its looseness) a perfect, well-made piece of work.

He could only account for it in the following manner, firstly, sufficient pressure was not brought to bear on the gums and the soft tissues adjacent, so that secondly the resulting size of the plaster model caused the further mischief.

On the other hand, the composition contracted in the process of hardening, thereby clasping the gums and

exerting pressure on them; at the same time, in forcing it into place, more pressure was required than with plaster, thus overcoming the elasticity of the soft tissues for the time being, and producing a more reliable, we will not say a more perfect cast, than was obtained by the plaster.

We will now proceed to explain the method of taking a plaster impression.

To perform this operation neatly, a temporary impression of the mouth should be taken in wax, and a plaster cast made. After removing the wax in hot water, and trimming the model up, a zinc model and lead counter should now be obtained, (see chapter on Casting in Metals), and a German silver or pewter tray swaged up. Or a more rapid method is by blowing up two sheets of meter metal in the steam swager. It is as well to cover the plaster model with a sheet of wax in order to make the swaged impression tray rather larger than the plain model, and capable of containing about one-eighth of an inch of plaster, spread over the surface.

The tray when finished, should be coated with a thin film of wax which may be melted on it, and to the posterior edge of wax a few shreds of wool may be tacked to the wax. The plaster is then mixed with water to the consistence of thick batter, and then spread over the surface of the tray, and incorporated with the wool at the back. This latter prevents any surplus plaster from falling into the mouth. The plaster should however, not be in a condition to flow when introduced into the oral cavity.

Before the introduction of a tray, the patient should be asked to gargle the mouth with warm water. It is now pressed up into its place, taking the same precautions as to drawing the cheeks out of the way, as with other materials, and it is kept firmly in its place until quite hard. This can be ascertained by testing the remaining plaster left in the basin.

For taking impressions of the mouth, when there are natural teeth standing, other and more complicated means must be adopted, but for this purpose we certainly do not think that plaster is the proper material to use, especially if we have to take it away in sections, and make a puzzle of it, before it can be put together again.

The great objection to plaster, besides what has been mentioned, is its disagreeable taste, the length of time it takes to harden, and also that undercuts cannot be taken with it, unless it is brought away in sections.

The non-exertion of pressure on the gums is its greatest advantage when an impression of a cleft palate, or other model, is to be obtained, and when the soft tissues are not to be displaced.

GUTTA PERCHA.

When using this material it should be softened in warm water, and kneaded into a roll; the tray is then warmed and the Gutta Percha placed in it and made smooth on the surface, it should then be carefully inserted into the mouth, and when pressed home, a jet of cold water or cold air should be directed on it to expedite its hardening. In the author's opinion the present material that we possess is not a reliable article, and will require considerable improvement before it approaches in value to any of the other compositions for taking a correct cast of the mouth. It takes longer to harden than plaster of Paris, and unless it is quite hard has the same tendency to drag as wax, and also possesses the same tendency to roll away from the place it is pressed against. It is, however, used by some practitioners and spoken very highly of.

COMPOSITION.

It should be softened in warm water, heated to about 165° Fahr., or rather warmer than one can bear the fingers in com-

fortably; on no account should it be placed in water too hot, for that spoils its qualities. When kneaded free from lumps it is formed into a roll and placed in the impression tray, which has been warmed by dipping it into the hot water. It should now be passed to and fro over a spirit lamp in order to further soften the surface, and if there are teeth present in the mouth, a slight quantity of vaseline or soap may be smeared with the fingers over the heated surface, this serves as a lubricant and allows of its easier withdrawal from the mouth. It is now ready for use, and when the tray is pressed into its place, should be held firmly until it is quite hard, when one may test the fitness of the case for suction work, by the amount of resistance met with in attempting to withdraw the tray.

INTRODUCTORY ADDRESS.*

By Mr. ALFRED SMITH, L.D.S. Eng.

Gentlemen,—When your Secretary informed me that you wished my consent to be nominated as your President for this session I felt considerably elated and proud of the honour you had done me. That was my first feeling. This was succeeded by a nervous sense of responsibility coupled with anxiety as to my ability to fill the position in a manner that would, in some small degree, be worthy of the record of my excellent predecessors in this chair. However, my first duty is to thank you most cordially for the honour you have done me in electing me as your President.

I feel convinced nothing tends further towards the stability

* Read before the Student's Society, National Dental Hospital.

and strength of any institution than the existence of a strong feeling of *esprit de corps* infused throughout all those who have a part in it. This Society, by bringing Teachers and Students together on other grounds than those of the teacher and the taught, and by assembling students under certain restrictions of etiquette for open discussion and the interchange of ideas, is doing much for the maintenance of that desirable spirit to which I have referred.

It is hardly necessary to point out how useful to the student is the training which prepares him for taking his part in the work of larger and older Societies. I refer to the Odontological Society of Great Britain and other kindred institutions which exist in various parts of the kingdom.

In addition to this, however, the immediate advantage is very great. Cases of practical interest are discussed, methods of treatment are explained, and theories are propounded and threshed out, all of these being valuable aids to the student in his educational progress.

In an address of this kind one would wish to give some words of advice that may be useful to the new Students. I should very much like to do so, but feel I have a great deal to learn myself.

However, I have passed a little further up the hill of professional life at least than most of you, and so there may be a few ugly rocks and corners difficult to turn that I can warn you of, or may be some few pitfalls which deceived me that I can help you to avoid.

"We learn more by our failures than our successes," said one of the pioneers of Dental reform now gone to his well-earned rest. I have that saying fixed very firmly in my memory. Is it not a true one? We work hard towards a certain goal, and by sparing neither time nor brains we eventually reach it. Encouraged by this result, we try for something else and, for some reason generally obscure to

ourselves, we fail. Thus pulled up, we set to work again more carefully, more thoroughly, with a wider grasp and greater determination. The prize is ours, and with it increased experience which is worth a great deal more.

Do not imagine that I despise success for a moment, or wish to discourage supreme effort to attain it. But are we not apt to think nothing of our failures except to regret them?

In a Society like this there is an excellent opportunity of ventilating our failures, and so benefitting others as well as ourselves. Do not be afraid of bringing them forward; their discussion may be very fruitful of good ideas.

In trying to recollect the most interesting papers I have heard at kindred Societies, that seemed of the most practical value, I have frequently remarked the modesty of the reader in detailing his successful experiments and researches, and the elaborate manner in which he described the methods and investigations that resulted in failure.

All who take an interest in Dental education must have noticed of late years a growing desire on the part of those aspiring to possess the diploma of our specialty to shorten, ignore, or shuffle through anyhow, the time required by our curriculum to be spent in acquiring the details of Dental Mechanics in a workroom.

One of our Licensing Bodies even went so far as to withdraw it from the Curriculum. Owing to pressure from the right quarter it has been reinstated, but our estimable Dean is worried almost daily with letters enquiring "in how short a time can I obtain the L.D.S. Diploma? and am I obliged to put in the three years' apprenticeship?"

I think few people outside our profession appreciate fully the value of the training to the hand and eye obtained in the workroom.

What should we think of the members of an orchestra

commencing the overture without first tuning their instruments, or of each performer endeavouring to get his instrument right during the pauses in the music, or whenever he could? Yet is not this what a student does when he comes to gain hospital experience, having neglected the opportunities he has had for mechanical training? Are his fingers in tune? Are his hands ready to handle instruments the right way? Or are his fingers all thumbs? Among the industrious band in the Stopping Room day by day, it is very easy for a dentist to recognise the man who has made good use of his opportunities for acquiring mechanical skill, or the reverse. And the patients must feel the difference much more keenly still.

Of course it may be possible to acquire, during the two years' hospital practice, the requisite facility of hand and eye. But only at the expense of much time, that should be spent in acquiring that valuable experience which is only to be obtained at a Dental Hospital.

"Such gatherings as these have done more to promote and foster the harmony and good feeling that now exists among the members of our profession, than anything else." These were the words of our chairman during one of our Students' Dinners. He was another pioneer in Dental reform, and a man possessing a good fund of sound common sense, and extensive knowledge of the world. Although our meetings here are not banquets in one sense, they at least may be intellectual treats, or mental feasts, providing the means of bringing the members into closer relationship with one another. It is hard to hate a man when you know him if he is a man at all, and although he may differ from you in many ways.

At this period in the history of Dental Surgery, it behoves every one to take to heart the highest interests of his profession, and endeavour in some way to aid in its forward march

We in the present era of our profession, owe much to those of our immediate predecessors who spared neither time nor health in their efforts to raise our profession to a position worthy of its highest aims, to alleviate human suffering, and to break down the almost unsurmountable wall of ignorance surrounding us on all sides.

We reap the benefit of those efforts by the training we obtain at our Dental Schools, and the increased respect with which our profession is regarded by the public, and more especially by the medical world. Now we must not be content to receive all and give nothing in return. We must not be content to leave our profession even as we found it, but should strive our hardest, each and all, to do something to help on the everlasting march of progress.

For notwithstanding all that has been done, there is still a great war to be waged against Ignorance and Quackery.

Education is our great stronghold, and I believe Societies such as ours, by fostering and developing the most exalted professional ethics in the student do much to fructify the good seed which is sown in educational establishments, such as the one to which we have all the honour to belong.

In our Students' Society I hope we may exchange with each other much of the good that we severally possess, whether of original thought or skilful devices (to be useful in our daily work), or ideas of a higher nature that may help to make us better men as well as good dentists.

I confess to a very selfish hope of learning much myself from the number of fresh ideas constantly cropping up during the reading of papers and the discussions that follow, which I have noticed recorded in our valuable Transactions.

I therefore trust that during the present session our meetings will be largely attended, and that this will be a very fruitful season which will worthily compare with those that have gone before.

In conclusion, I thank you for the pleasure you have afforded me, in listening so courteously to these few rambling remarks, at the same time assuring you that so long as I have the privilege and honour of ruling over the destinies of this Society, I shall devote my most earnest endeavours to the furtherance of its highest aims and objects.

NOTES FOR DENTAL HISTOLOGY.*

By J. W. PARE, M.D.

In making sections for examination the object is to see the structure of the tissue as it occurs in nature and, to attain that end, the less the specimen is manipulated the more likely is it to be unaltered.

FIXING.—The moment a live tooth is removed from its socket its structure begins to alter, and to prevent this it must be fixed. The action of the fixing agent is to coagulate the albuminous, gelatinous and mucoid portions of the tooth, e.g., pulp, dentinal fibrils, contents of interglobular areas, and thereby prevent post-mortem decomposition. Two kinds of “fixing” agents are used, one chemically combines with the tissue, as chromic and osmic acids and gold chloride, and the other coagulates but does not combine with the tissue, as corrosive sublimate and picric acid. If the soft parts of a tooth have been fixed with Hg. the tooth must be placed in running water to wash out the fixant, or otherwise a black precipitate will disfigure the specimen (Mummery) and to aid its removal a 2 per cent. sol. of Iodine is used till the latter ceases to be discoloured.

* Used at the class at the National Dental Hospital.

HARDENING.—In order to obtain hard and soft tissues in situ the next step is to soften the hard, and stiffen the soft tissues, or to let the hard remain hard and stiffen the soft. The latter method is the better because the soft parts only are those likely to be altered.

I.—*To harden the pulp and soften (viz. decalcify) the dentine.*

1. Harden the soft parts with 2—5 per cent. of ammon. bichromate or chromic acid one-fifth per cent. solution or Muller's fluid ($\text{KBr } 2\frac{1}{2} \text{ Na}_2 \text{ SO}_4 \text{ H}_2\text{O. } 100$).

2. Decalcify the hard parts with a sol. composed of the following:—chromic acid $\frac{1}{4}$, $\text{HCl. } \frac{1}{2}$, $\text{H}_2\text{O } 100$. Another method is to decalcify dentine, and harden pulp at the same time by using a saturated solution of alum containing a few drops of HCl to every fluid ounce.

The specimen must now be embedded (vide below) and sections cut, after which the embedding material is removed and the section stained, cleared, and mounted.

II.—*To harden the pulp to same degree as the dentine.*

The best method is Weil's, and it is shortly this:—

(1) Fresh tooth put in HgCl_2 to fix. (2) HgCl_2 washed out with water. (3) The specimen is put through gradually increasing strengths of S.V.R. up to absolute alcohol. (4) staining solution. (5) clearing. (6) increasing thicknesses of solution of Canada Balsam (7) heating till balsam is quite hard. (8) grinding down. (9) mounting.

IMBEDDING.—There are two varieties. (1) Simple imbedding and (2) infiltration or interstitial embedding. No. 1 is not nearly so good as No. 2, and so the latter only will be described. In this method not only does the tissue receive external support, but also internally.

(a) *Paraffin.* Soak tissue in cedar oil or chloroform and then place in bath of melted paraffin for an hour, and cool rapidly, then cut sections. Or dissolve paraffin in CHCl_3 and

place the specimen in this solution, apply heat till all the bubbles (CHCl_3) cease, cool quickly and make sections.

(b) *Collodion*. Having hardened the tissue with alcohol, place in Ether, which permeates the mass, and then in thin collodion which follows the Ether; finally harden the collodion with CHCl_3 and cut sections.

(c) *Gum*. Place tissue in a solution of gum and harden with S.V.R.

STAINING.—By this means different constituents of the tissue are to be demonstrated owing to the fact that certain stains have a greater affinity for one element than the others. Gold chloride stains nerve tissue, osmic acid fat cells, Bismark brown bacilli. Some stains,—e.g., carmine,—stain all tissues alike and are called “general” stains. Others, as hæmatoxylin, affect the different parts at different rates as e.g. nuclei being stained before the other elements. Stains can be mixed with advantage; carmine and aniline-blue give to axis cylinders and nerve cells a reddish violet colour, blood vessels a bluish violet, and connective tissue a pure blue.

MOUNTING.—The slides must be uniform in thickness, and free from scratches. The cover glass must be very thin or else the specimen cannot be examined with high powers. Unstained hard sections must be dehydrated with alcohol, then dried on blotting paper, next placed in cedar oil to clear, and again dried, and lastly mounted in Balsam.

Stained specimens (with aniline dyes) must be washed in water to get rid of excess dye, then in alcohol, then cedar oil and finally mounted in balsam, xylol or dammar.

Avoid glycerine for calcareous specimens as the carbonate of lime is gradually dissolved. Always have mountant of same density or less than the specimen, e.g. do not mount sections of lung in thick balsam.

The best mountants are Balsam, Farrant's Medium (Gum Arabic 4 oz., Glycerine 2 oz., satd. sol. of As_2O_3 in water 4 oz.) or satd. sol. of Acetate of Potash.

Ring with shellac varnish, zinc white, etc.

British Journal of Dental Science.

LONDON, MARCH 1st, 1895.

DENTISTRY IN FRANCE.

OUR French brethren seem to be passing very successfully through the modifications of professional life brought about by the changes introduced under the new Law. We cannot help thinking that the majority now fully recognize the advantages which a State-regulated diploma will command ; and although there may still linger regrets that the Schools and the teaching are not so "free" as formerly, the concurrent compensation will gradually smooth perturbed spirits. Two gentlemen, MM. GODON and A. RONNET, have just published the conclusion of their Report, addressed to the Minister of Public Instruction, upon the organisation of dental teaching in the United States. They were, naturally, much impressed by all they saw and heard, but we are glad to find that while almost envious of the results produced by private enterprize in America, they still brought back sufficient patriotism to enable them to allude with confidence to the present position of the profession in their own country. One of the quaintest parts of the Report is that recording the necessity which exists for differentiating between the attitude of Americans in America and that of Americans outside America. The selfish indifference, amounting sometimes to hostility, manifested by some of the latter class in the country of their adoption is properly condemned, and the existence of honourable exceptions is, of course, recognized.

At the end of last year the Council of Public Instruction agreed upon certain modifications of the existing regulations. These have since been officially announced, and some

of them seem open to criticism. The first deals with the requirements of those Schools which wish to undertake the necessary curriculum. They must provide lectures on Anatomy, Physiology, Pathology, besides the special courses, and there must be at least three Doctors of Medicine on the teaching Staff. Laboratories for Histology and Bacteriology, besides a dissecting room, must also be included, all of them completely equipped with the necessary instruments and apparatus. The second decree is of great importance, and curiously enough touches upon the subject which has been exercising English minds. The former Rules describing the Examinations demanded the construction of a piece of mechanical work; now this is changed to "the preliminary operations of mechanical dentistry." Thirdly, there is a list of exemptions for medical students who wish to take the dental Examination. We gather that a third year's medical student may compete with the dental student, provided he has attended for a year the dental department of a General Hospital. As our friends point out, the material at such a clinic is not sufficient, nor the practice such as is required for dental teaching, especially when the department is only open twice a week. We may remind them, however, that here in England a student may, if he desires, attend the dental department of a recognised General Hospital for the necessary two years' practice; but how many do so? The student goes where he will get the teaching and practice which will enable him to pass his Final Examination, and the French teachers will find the same hold good at their Schools. The point about which there is most ground for complaint is the one modifying the Examination in Dental Mechanics.

We are glad to observe that the necessary organisation is now completed for the holding of the first "National Dental Congress" in the Provinces. The professional Societies in Paris took the preliminary steps to inaugurate such a meeting, and after consultation with the South Western Society of Dentists (which had been endeavouring to join in the proposed Exhibition at Bordeaux), it has been finally decided

that the first of a series of annual meetings in different parts of France shall be held at Bordeaux on the 16th, 17th and 18th of August. The questions proposed for consideration are, first, New Methods and Appliances in Regulation, with an Exhibition of specimens and of models of Abnormalities, and, secondly, the Organisation of professional Education in the Provinces. We notice that both the Local and the General Committee reserve the right of refusing to admit to the Congress any Dentist or Doctor who attracts public attention in a way inconsistent with the professional dignity.

THE ELECTRICAL FUSION OF PORCELAIN.—Dr. L. E. Custer has described, in a paper read at the end of last year, an electric oven for porcelain work. In order to make use of this new form of heat, the muffle is much reduced in size, and in form resembles somewhat an ordinary vulcanite flask, with a current for the upper and another for the lower part. For crown and bridge work a still smaller muffle is used, and the 110 volt current is sufficient to pass through the cover and base as a single current. In the upper part is a small opening for observing the fusing process. Amongst the advantages claimed for this method are the following. Sufficient heat can be obtained to fuse any porcelain used in Dentistry, and there is no danger of "gassing." The heat can be easily controlled by the introduction of a rheostat, while the current is easily switched off at the conclusion of the fusing and the case left to cool without being disturbed. The author allows about two hours for this.

AUSTRALIAN DENTAL DIPLOMAS.—The Dental Students' Society of Ballarat, has been asking questions of the Dental Board of Victoria. They point out that in order to obtain

a degree it is necessary that the body granting the degree be affiliated with a University, and that students must matriculate before being able to attend the necessary lectures. The Society also wished to know whether if the Board appointed lecturers independently, the degree of L.D.S. would be legal and be recognised throughout the British dominions. The Dental Board apparently found it easy to reply that the certificate of qualification was not a Degree, but a Diploma. It is granted according to the Victorian Dental Regulations which hold good only so far as Victoria is concerned. It rests therefore with all outside Colonies and countries to determine for themselves whether they would recognise the Victorian diploma. And so the natural ambition of the Dental Students for the possession of a University Degree seems to be a little premature.

THE FORCE OF GRAVITY AND THE CIRCULATION.—One of the points most strongly insisted upon in the inhalation of chloroform is that the patient must be placed in the horizontal position. In connection with this matter a communication to the Royal Society, by Dr. Leonard Hill is of much interest and practical importance. As a result of a certain series of experiments, he comes to the conclusion that the force of gravity must be regarded as a cardinal factor in dealing with the circulation of the blood. The duty of compensating for changes in position devolves upon the splanchnic vaso-motor mechanism, and this compensation, varying according to individual differences, is far more complete in upright animals such as the monkey, and probably in man, than in rabbits, cats and dogs. In man gravity exerts but little disturbing influence because of the perfection of the compensatory mechanism, but when this power of compensation is damaged by paralysis of the splanchnic vaso-constrictors by operations, injuries to the spinal cord, asphyxia, or by some poison, such as chloroform, then the influence of gravity becomes of vital importance.

ANKYLOSIS OF THE JAW.—Mr. E. N. Nason, of Nuneaton, has narrated in *The Lancet* the case of a man who, some ten years before coming under notice, received some ill-defined injury to the right side of the face. Two years and a half later, movement of the jaw became restricted, and two years later the mandible became completely fixed, so that the teeth could not be separated. The man was nearly starved, so the following operation was performed. Half an inch below the zygoma an incision was made down to the bone along the posterior border of the ramus to the angle. Bony and fibrous thickening was found round the condyle. Having cleared the ramus a wedge-shaped piece, with a base posteriorly of half an inch, was removed by means of a key-hole saw and cutting pliers. The inferior dental artery gave no trouble, and the patient made a good recovery. He began to masticate with very little pain on the third day, and a space between the teeth of seven-eighths of an inch had given no sign of lessening a year later.

A NOVEL FORM OF MALINGERING.—It is astonishing what tricks some morbid persons will resort to in order to excite sympathy, or avail themselves of the privileges due to infirmity. Dr. FELIX SEMON recently described, at the Clinical Society, a case of chronic self-inflicted ulceration of the throat. The condition had existed practically without interruption for four years. The mucous membrane of the soft palate, the uvula, the arches of the palate, the tonsils, and the posterior wall of the pharynx were a mass of infiltration and ulceration. It was noticed that the condition abruptly terminated with almost parallel borders, both above and below, where the patient would not be able to reach. She was unmarried, aged thirty-six years, and refused to place herself under strict supervision. On another occasion her lips and throat had suddenly become white. Her medical man, however, assured her it was not diphtheria, as was feared, but had been caused by some application, probably nitrate of silver, and the whiteness soon disappeared.

THYROID FEEDING IN ACROMEGALY.—We have many times called our readers' attention to cases of acromegaly, one of the prominent features in which disease is an enlargement of the jaw. At the Liverpool Medical Institution, Dr. Caton showed lantern photographs of a patient, a woman, aged twenty-seven, in whom enlargement of the hands, feet, lower jaw, tongue, nose, and lower lip had taken place. There were also other symptoms of acromegaly, and she failed to improve under ordinary general treatment. She was then given three tablets a day, each containing two grains of pituitary body, and her condition showed much variability; sometimes she was much better. After about six weeks, thyroid tablets were alternated with the pituitary tablets, and improvement was at once marked and rapid. The headache and œdema disappeared, vision became normal, and the hands, feet, and lower lip diminished in size. Her facial expression changed, muscular strength increased, and she became as cheerful and active as she had been three years before.

THE FRENCH DIPLOMA.—The results of the second examination have just been published in *L'Odontologie*. There were 101 candidates, of whom 82 were successful. 90 per cent. of those trained at the Paris Dental School satisfied the Examiners.

DENTAL BENEVOLENCE.—Mr. John Ackery, the energetic Secretary of the Benevolent Fund of the British Dental Association, writes to ask us to say a good word in support of the Cause. He issues an Appeal for further subscriptions, and inasmuch as the benefits are only restricted to those whose names appear as Registered Dentists (or their families) it seems that such a catholic Fund is deserving of support. The Treasurer, Mr. A. J. Woodhouse, of 1 Hanover Square, or Mr. Ackery, of 11 Queen Anne Street, will gladly receive donations, or Annual Subscriptions from five shillings to five guineas. A summary of the past year's

work is as follows:—"During that period twenty fresh applications have been received; one case was refused as being ineligible, the applicant being unregistered. Two cases were helped with advice only, as their circumstances did not require immediate pecuniary aid; five cases were rejected as being undeserving; the remaining cases were relieved according to their merits, and with due regard to the limited means at the disposal of the Committee. More satisfactory results could have been obtained in many cases if the Committee had more money to disburse. These, together with others still on hand, make twenty-six cases receiving pecuniary help during the past year, and in many instances there were several members in each family. Five children were aided to secure election at orphanages, and a broken-down dentist, aged 54, was helped to obtain a home for life. The education of six children is being paid for, and the expenses of a musical education are in part defrayed for another who will shortly be enabled to earn her livelihood by teaching. A weekly sum for maintenance is being paid for a young man who, through the interest of the Fund, and the kindness of professional sympathisers, was, some two years ago, accorded free mechanical pupilage and free curriculum at a Dental Hospital. Three lads who had been apprenticed have lately gone out into the world, having had the first essentials provided for a successful career. Several have had grants to tide them over critical periods, to pay arrears of rent, &c. Some nine or ten others, from old age or inability to earn a living, must practically be looked upon as permanently dependent on the Fund. If the reserve could be raised to an adequate amount, such cases as the last-named might become annuitants, but as the Committee cannot grant money in anticipation of the yearly income, these poor persons are in constant dread lest their grants should cease."

Review.

THE ANATOMY AND PATHOLOGY OF THE TEETH. By C. F. W. Bödecker, D.D.S.; M.D.S. With 325 Illustrations. Philadelphia, 1894. The S. S. White Dental Manufacturing Co.

This is not a fire-side book, but requires to be taken to a solid table and studied seriously, and although its 676 pages contain a good deal which has not yet become accepted it is a fine book which repays reading. Much of the text and many of the illustrations take us back to the pages of *The Dental Cosmos* and *The Independent Practitioner*. Space forbids an exhaustive review, so we propose to select a few passages for criticism and quotation, chiefly from the first part dealing with Anatomy.

Chapters VIII and IX deal with the subjects of General Histology and the Development of Connective Tissue from the point of view adopted by the Heitzmann School, and so we have a good deal about a reticulum of living matter to be found not only in the Cell itself but also permeating the intercellular substance. "Every tissue originates from protoplasm in the state of indifference,—the so-called *embryonal*, or *medullary*, tissue. No tissue can be transformed into another unless it has first been reduced to the embryonal condition." Under this law the odontoblasts and ameloblasts are held to split up into "indifferent" corpuscles in order to give rise to Dentine and Enamel.

In the preceding Chapter VII, dealing with the General Anatomy of the Human Teeth, we read "Enamel is composed of so-called prisms, exhibiting transverse striations, the Striæ of Retzius. Between these enamel prisms there are narrow interspaces which hold delicate beaded fibres, the *enamel-fibrillæ*." Nasmyth's membrane is regarded as a thin layer of horny epithelial tissue in direct union with the outermost epithelial layer of the gum. Dentine is regarded as a modified bone-tissue, and the suggestion is made that each root of a tooth represents a large Haversian system, the pulp in the centre, with the outer layer of cementum as the concentrically lamellated cortex. In between is the dentine traversed by dental canaliculi which may be considered as elongated offshoots of bone corpuscles. If reference were made to the stratiform arrangement of the dentine which can sometimes be seen (alluded to by Mr. Mummery) then the analogy would

be still more complete. "Lymph-vessels are unquestionably present in the pulp, but nothing positive has yet been ascertained as to their course and origin."

With regard to the question of nutrition, the author explains the removal of lime-salts from the dentine (apart from that occurring in Caries) in the following manner. Under the highest powers of the microscope he is able to see a narrow light space between the fibril and the wall of the dentinal tube. This space, he says, is evidently filled with liquid which serves for the carrying of nourishing material to the dentine, and for the carrying of effete material away from it. This condition exists also amongst the delicate fibrillæ in the basis substance. Not content with leaving this interchange of material to the process of osmosis, or diffusion, the author has a theory that the fibrils contract, and not only stir the surrounding column of liquid, but pumps, as it were, nourishing liquid into and away from the Dentine. "The chemical character of the liquid may explain the dissolution of a certain amount of the lime-salts," which being rendered "effete" may be carried into the lymphatics of the pulp and thus eliminated. He is not able yet to understand why in one instance nourishing material should be carried from the pulp to the Dentine, and in another instance away from the Dentine into the lymphatics. Neither are we, but it seems necessary to at least postulate an alternating dilatation with the contraction of the fibrillæ. Having got so far this appears a small matter. The same state of things is held to apply to the Enamel, except that as this tissue is farther away and has less living matter, the process is necessarily slower.

These, and similar, views upon Histology and Anatomy prepare us for the statements which we meet with in the latter, Pathological, portion of the book. When treating of Eburnitis or Inflammation of Dentine, a comparison is made with what takes place in Bone, and the two tissues are held to be formed in a similar manner. The odontoblasts are regarded as merely preliminary formations. These cells are supposed to break up into rows of medullary corpuscles between which "the larger threads of living matter" are formed as the dentinal fibrils.

With these few extracts we must now bring our review of this book to a close. The work has been adopted by the National Association of Dental Faculties in America as a text-book for Dental students, and we hope it will receive due consideration in this Country also.

Abstracts of British & Foreign Journals.

PYORRHEA ALVEOLARIS TREATMENT.

By Dr. ZAVIER SUDDUTH.

In the chronic and suppurative form of pyorrhœa the general line of treatment should be stimulating and antiseptic for the local lesion, combined with constitutional remedies when complications present.

Let us first take up the uncomplicated form, where there is more or less destruction of the alveolar process, with consequent loosening of the teeth involved. The first step in treatment is mechanical, consisting of the thorough removal of all calculus, salivary and serumal, from the neck and roots of the teeth, and washing out the pockets with some antiseptic solution that will put the parts in a better hygienic condition. After a number of years' experimentation, I have settled down to the use of H_2O_2 as the best agent to begin treatment with. It is a mechanical cleanser and antiseptic combined that has no superior. It is very diffusible, and readily penetrates into all pockets and sinuses, bringing the *debris* to the surface. There are a number of different preparations on the market, but for stability and variety of form I have no hesitation in recommending pyrozone, manufactured by McKesson & Robbins. The three per cent. aqueous solution contains less than one-twentieth of one per cent, of free acid, and the five and twenty-five per cent. ethereal solutions only a trace. The presence of a small proportion of acid is essential to the stability of all preparations of H_2O_2 . Its presence is not, however, detrimental, as it can be readily neutralized by the addition of one or two grains of carbonate of magnesia, or what I consider better still, by using a part or a whole tablet of soda-mint. This must be added to the portion of pyrozone to be used in the treatment, and not added to the stock, for the reasons above stated. So used, it produces marked effervescence, and by liberating the extra atom of oxygen more rapidly than without it, adds materially to the value of the drug as an antiseptic and cleanser. Another precaution that

is well to observe is the bringing of the solution to the temperature of the body by immersing the beaker containing the solution in a vessel of hot water. By so doing, the temperature is raised and pain is many times avoided in its application. The high temperature also favours disintegration of the solution. The three per cent. form, prepared as above, is used from time to time during the process of removal of the calculus from around the roots. The mechanical treatment of these deposits cannot be too thorough, and seldom can be accomplished at one sitting without prolonging the operation too long. After removing the calculus attention should be given to the articulation as one of the causes of mechanical irritation. This is too often overlooked by dentists. If any particular tooth is striking too hard, so as to give rise to pericementitis, it should be ground off, or a rubber cap placed upon the adjoining tooth until the pericementitis shall have subsided and the tooth settled back into its socket. Many times it will be found that there is a permanent mal-occlusion that may give rise to a recurrence of the irritation. In such cases, the irregularity must be corrected by mechanical means, such as regulating or grinding off the offending teeth, or capping the adjoining teeth that may have been unduly worn down.

Before dismissing the patient, prescribe three per cent. pyrozone and soda-mint as a mouth-wash, and let two days at least intervene before making a second appointment, so as to allow for the certain improvement in the local conditions before resuming the mechanical treatment. At the second sitting, the pockets should be packed with cotton saturated with three per cent. pyrozone and cocaine, and allowed to remain for a few minutes before beginning operations. By so doing the pockets will be distended, and the cocaine will produce local anesthesia, and lessen the vascularity for the time being, although the consequent hæmorrhage will be the more profuse by reason of its use. The dilation and blanching of the parts by the cocaine solution will enable the careful operator to thoroughly examine all the exposed surfaces, and determine whether or not he has removed all concretions.

In case he cannot see all parts of the pocket, he must depend upon a cultivated touch to determine as to the thoroughness of the cleansing process. Any small portion overlooked will serve as a nucleus for further deposits and prevent absolute cure. After satisfying one's self of the removal of all deposits from the roots, then rinse the pockets

out thoroughly with three per cent. pyrozone, and finish by using the five per cent. solution. If a stronger solution is wanted at this sitting, it may be obtained by shaking together two parts of the twenty-five per cent. ethereal solution and one part distilled water, and separating through a funnel. The lower portion will be found to contain about a twenty-five per cent. of absolute H_2O_2 aqueous solution, which may be diluted to any strength desired, and used with perfect safety, as it will not injure healthy tissue, although destroying granulation, infected, and diseased tissues. Healthy tissues are bleached white by its action, but soon return to their normal condition.

For applying the stronger solutions, I have adopted the well-known medicine drop-tube, by drawing out the points of several and giving them different curves, some rights and lefts, and some simply right angles. Instead of the white rubber bulbs I use the black ones, as they are not affected by the pyrozone as are the white ones. With this simple and inexpensive syringe I can introduce the five per cent., and even the twenty-five per cent., solutions with convenience and perfect safety. Nevertheless, I always take the precaution to dip my hands in water before using these solutions, and to moisten the patient's lips, and keep a wet napkin over the lower portion of the face as a safeguard against the desiccating effect of the drug should it come in contact with healthy tissues.

At the close of the second sitting the patient is instructed to continue the use of the three per cent. solution freely, and return the next day but one following, when, if any of the teeth do not seem to be improving, the pockets are again packed with the three per cent. solution and cocaine, and a third attempt made to discover any overlooked deposits on the roots. In case the pockets still appear angry, and the teeth remain loose, they should be treated with the twenty-five per cent. ethereal solution, either by using the drop-tube, or by wiping them out with cotton saturated in the solution, and wound around a Japanese toothpick held in an adjustable handle that will allow of the placing of the pick at different angles. The patient is dismissed with careful instruction as to absolute cleanliness of the oral cavity, and, if necessary, shown how to use the brush and floss silk between the teeth. In most cases this is all that is necessary, and the continued use of the three per cent. solution of pyrozone as a mouth-wash will accomplish a permanent cure. Some object to the

soapy taste left in the mouth by the drug, but this soon disappears, especially if the soda-mint is used as directed. From the success that has followed the above system of treating pyorrhœa alveolaris in my hands, I am fully convinced that no one drug will accomplish as much in as great a number of cases as the pyrozone solutions following thorough mechanical treatment.

If a considerable portion of the alveolar wall is lost by absorption, then it will be found necessary to fasten a number of teeth together, and thus secure immobility, a condition very essential to the best results in bad cases. This may be done by ligating with cord or wire, but is, however, better accomplished by bands soldered together, or by raised caps cemented into the teeth loosened by disease, and, perhaps, in some cases, including a few teeth not diseased.

In some instances, however, by reason of lack of co-operation of the patient, or his systemic condition, success does not immediately follow. In such cases other lines of treatment are necessary. If the tissues remain flabby, and fail to shrink around the teeth, I have found the chloride of zinc a most excellent remedy. It is antiseptic and astringent. In fact, before the advent of H_2O_2 I used it almost altogether, in full strength, fifty per cent. solution for the pockets, and well diluted as a mouth-wash, as follows :

R.—Zinci chloridi, gr. xx ;
Aquæ dest., ʒiv —M.

Sig.—As directed.

Begin using it three times daily, diluted four times, and continue its use until the gums are blanched. Insist on having distilled water used in compounding the prescription, otherwise there is danger of a flocculent precipitate forming if kept for any length of time. This is probably due to the presence of carbonate of ammonium in the water, which may be overcome in stock solutions by the addition of a small quantity—a few drops—of hydrochloric acid. Some druggists object to filling the recipe on account of the poisonous character of the drug. Always instruct the patients as to its poisonous character, and caution them to keep it out of the way of children.

In 1888 I called the attention of the profession to sozoiodol and zinc as a remedy that gave promise of being of use in the treatment of suppurative catarrhal conditions. I have had it in almost constant use ever since, and find my predictions more than verified. Since the introduction of sozo-iodo

I have discarded the use of iodoform entirely. Its odour has always been the bane of the practitioner, and now that we have a substitute that is odourless there is no excuse for its use in dental practice.

Sozo-iodol is a di-iodo-phenol-sulphonic acid, and contains fifty-five per cent. of iodine, twenty per cent. of phenol, and seven per cent. of sulphur. The salts are odourless, and vary as to solubility. Sozo-iodol and zinc dissolves quite readily, while the mercury combination dissolves more slowly.

Schwimmer suggested the addition of two and one-half per cent. of laudanum to the solution of from one-half to one and one-half per cent. of the sozo-iodolate of zinc in all acute cases of catarrh.

The sozo-iodol and zinc is my favourite form. I also use it as an ointment for packing pyorrhœa pockets. If its application is painful, add a few grains of acetate of morphia to the ounce, as follows :

R—Sozo-iodol and zinc, gr. viii ;
Morp. acetatis, gr. ij ;
Lanolin, ʒj.—M.

Sig.—Use as a topical application in pockets.

Where a decided escharotic action is desired in chronic cases, trichloracetic acid (twenty per cent.) will be found useful, and will produce less inflammation than the same strength solution of nitrate of silver. The indications for its use are a considerable degree of tumefaction with a tendency to eversion of the free margins of the gums, due to excessive granulation. In some cases it is necessary to precede its application by a ten per cent. cocaine solution. The same results may be obtained by applying a ten per cent. solution of chromic acid, and I believe that it will be found preferable to trichloracetic acid, being fully as efficacious and much less painful.

Robin recently presented a new combination of iodine, under the title of "iodozone," which he claims is a powerful antiseptic, and which has been employed successfully as an oral antiseptic. It is said to be a white liquid with all the good and few of the bad qualities of iodine, being less irritating and caustic in its effects. Although I have not been able to procure any of it for practical use, I look so favourably upon all the preparations of iodine that I have no hesitancy in recommending it on the results claimed for by its discoverer.

Dr. Black advocates the use of oil of cinnamon and carbolic acid as follows :

Oil cinnamon, 1 part ;
Carbolic acid (crystals), 2 parts ;
Oil ganltheria, 3 parts.

Syringe pockets once in four days, full strength. He further recommends for an after-treatment, after parts have shown a tendency to heal, a mouth-wash to be used by patients, —the 1-2-3 mixture just described, diluted one-half with anise oil or oil of lemon, on a brush. He also recommends eugenol and bichloride of mercury. The latter is objectionable as a permanent mouth-wash because of its poisonous qualities and its action on the teeth. Creolin has been advocated by some. The main objection to its use in the mouth is the bad odour produced by it when brought into contact with pus in any quantity. Camphoric acid has of late years been used in the treatment of purulent conditions with marked success, and seems to be specially indicated in pyorrhœa alveolaris as a mouth-wash in the strength of one half grain to the ounce of distilled water or peppermint water. It may be used in one per cent. solution in pockets.

The Dental Cosmos.

ADULTERATION OF BEESWAX.

A. Kremel shows that it is possible to produce, by mixing Japan wax, stearic acid, and ceresin in suitable proportions, a compound closely resembling genuine beeswax in appearance, possessing the same melting point and refracting index, yielding the same figures by Hübl's saponification process, and differing only in having a lower specific gravity. He recommends that in all cases the specific gravity should be taken and qualitative tests applied for stearic acid, resin and Japan wax.

Pharm. Journal.

THE FREQUENCY AND IMPORTANCE OF OTITIS MEDIA IN SICK CHILDREN.

Dr. Rasch, of Copenhagen, has examined the middle ear in 61 post-mortem examinations of children up to two years of age. The middle ear was normal only in 5 cases (8 per cent) in 46 cases (75.5 per cent.) suppurative otitis media was found in either one or both ears, and in 8 cases (14.5 per cent.) simple catarrhal otitis media was present. Otitis media was observed in nearly all the children who had died of broncho-pneumonia (43 cases), but had not been diagnosed during life, on account of the membrana tympani being rarely perforated, although pus was found in 77 per cent. of these cases. Several of the children had exhibited brain symptoms sometimes so marked that meningitis was diagnosed during life, while the post-mortem examination revealed no affection of the brain or its membranes. In 43 cases the exudate was examined more minutely, and in 33 of these pneumococci were present. Whenever pneumococci were found, the tympanic membrane was without perforation. Perforation of the membrane was, on the whole, a very rare occurrence appearing only in 4 of the 61 cases examined. The author is inclined to believe that broncho-pneumonia in infants plays a role in the etiology of deaf-mutism, the otitis media extending to the internal ear.—*Canadian Medical Journal*.

The following table shows the average melting-points of some of the gums used by dentists.

Red copal resin from Angola	...	220-250
Yellow " " Benguela	...	225-245
Copal resin from Sierra Leone	...	180-185
Hard Manila copal	...	190-205
Kauri gum (New Zealand)	...	190-240
Congo copal	... ..	225-245

To remove the black deposit from rubber plates that have been in long use, I take of alcohol, ammonia, and chloroform equal parts. Pour a little of the liquid onto the plate, add pumice stone, and quickly scour; then polish with oil and plaster, in the usual way.—*Dr. W. D. Tickner*.

Reports of Societies.

STUDENTS' SOCIETY, NATIONAL DENTAL HOSPITAL.

The Annual General Meeting of the Society was held on Friday, January 11th, 1895. C. W. Glassington, Esq., President, in the Chair.

The minutes of the previous Annual General Meeting were read and confirmed, and Mr. Robertson was proposed for membership of the Society.

The election of Officers for the ensuing year then took place.

The Council proposed as President, Alfred Smith, Esq. This nomination was carried unanimously.

The Vice-Presidents were then announced, viz.:—C. W. Glassington, Esq., and W. Rushton, Esq.

A ballot having been taken, the following gentlemen were declared elected as Members of the Council:—

Past Students—Messrs. J. T. Fripp, R. E. Nicholls, and J. W. Smith.

Present Students—Messrs. C. Everitt, S. F. Rose, and W. J. Humby.

Secretary to the Society—Mr. C. Mullord.

Treasurer and Secretary to the Council—Mr. H. J. Relph.

Librarian and Curator—Mr. J. S. Worsley.

Mr. Glassington proposed and Mr. Nicholls seconded that as this was a purely business meeting the Casual Communications should be held over till the following month. Carried.

The Balance Sheet was brought forward, and Messrs. Clements and Wheeler were proposed and seconded as Auditors.

Mr. Glassington then gave his Valedictory Address as follows:—

Gentlemen,—Once more you are to be inflicted with an address from me. What shall I say to you? First of all it will be only courteous on my part to thank you for having so ably supported me during the time I have been your President. Our meetings for the last twelve months have been interesting, instructive, and well attended. Personally I should have liked to have seen more Old Students present

but suppose we can safely put down their absence to the fact, they had "metal more attractive," by metal I mean business, which to the successful practitioner turns into the best of metals—Gold. We have had, however, several regular attendants from among our old students, and without mentioning any names, I beg to thank those gentlemen for the support they have given this Society, not only during the past year, but ever since they have been connected with this Hospital. To the present students my thanks are also due for their constant attendance at these meetings, though one would have wished they had not been *quite* so silent. I had no idea students were of such a noiseless, or shall I say, voiceless nature. Two of my colleagues were kind enough to come forward and bestow on us much of their valuable time, the one giving a demonstration on "A Combination of Amalgam and Gold Fillings," and the other a practical paper on "Mineral Inlays." I allude to Mr. Humby and Mr. Rose. Then Mr. Spencer, Dean of Westminster Hospital, read a paper on "The Joint of the Jaw." This was dealt with in such an exhaustive manner as to be almost beyond the discussive or argumentative powers of the present student, but was instructive to all present. The remainder of the papers have been read by our embryo L.D.S., viz., Messrs. Fox, Jones, Sunderland, and Wheeler, and I think they may compare favourably with those of former years.

The Casual Communications have been quite up to the usual standard, and have in fact, taken up more than the regulation time.

In May last, this Society gave a *Conversazione* which was pronounced by one and all a great success. As this was the first year in our new building, our Society thought they would show their appreciation of it, by inviting their friends, not only to give them a pleasant evening, free from the torments and worries of Dentistry; but also to show off the new premises. The success of that evening was greatly due to the generous way in which the staff of this Hospital assisted us financially. We are also indebted to many kind friends for presents of books, specimens, &c.

A Tennis Club has been established during the past year, but though the attendance has been deficient in quantity, it has not lacked in quality. I trust that in the year we are entering on, neither will be found wanting.

Our finances, gentlemen, as you have heard, are at a low eb. It is true we have launched out somewhat freely this

past year, but if our old members would only keep up their subscriptions, our banking account would be in a flourishing condition.

In a Valedictory Address a President has plenty of subjects to talk about, such as "The Ethics of the Dental Profession," "The Medical Council and the Dentists' Act," "The limitation of Dental Surgery," or "Should Dental Surgeons operate on Dental Cases," &c., or he may trot out some favourite hobby of his own.

Gentlemen I have no hobby, unless it be "The National Dental Hospital and School." Although there are many of the Staff who have been connected with our institution longer than myself, few, if any, have gone through the various gradations, from student, to being one of the senior surgeons, as I have done. I can look back with pleasure to the time, when as a student I received my dental education from the various members of the Staff, and later on when as House Surgeon, I was treated by them with kindness and consideration, during the period I filled that, at times, difficult post. And when at length a vacancy for the post of Administrator of Anæsthetics occurred, they welcomed me as one of themselves. Afterwards I was honoured by the post of Lecturer on Dental Materia Medica and Therapeutics, and again later on, as Assistant Dental Surgeon. Can you wonder then, gentlemen, at my hobby? My only regret is, that I cannot give up more of my time for its advancement. That this Hospital and School will flourish, is my most sincere wish. Some of the preceding words may sound like self praise, but I do not mean them as such. I want to point out to the Present student, what is open to him if he only clings to his Alma Mater. The Medical Committee are always willing and anxious to welcome an old student, as one of the Staff, whenever an opportunity occurs. This should be a great inducement to those men, who can give the requisite time to Hospital work, and who wish to do so, to stand by their old school, and so do their best to promote its interests.

Of course there are some men who although living in London, cannot afford to give up the time necessary for Hospital work, but there are many other ways in which they can very materially assist this School, as I pointed out in my introductory Address. Some few old students complain of "a want of touch" between the Staff and themselves. This, I am sure, is their own fault. How can he (the old student), expect the Dental Surgeons to remember him, if he does not

pay periodical visits to the Hospital, or attend these meetings, or keep himself in communication with the Hospital, if he resides in the provinces. The Dental Surgeon goes on his work week after week, and year after year, continually seeing fresh Students, and when after some considerable period has elapsed, the old student turns up one morning at the Hospital and does not make himself known, he finds he is not remembered, and goes away dissatisfied, saying, "The place is changed," &c. To the present students I would say, continue to work in the future as your predecessors have done in the past, and strive to be a credit not only to yourselves but to your School.

Gentlemen, I am afraid I weary you. The only excuse I can offer for detaining you so long, is the future welfare of your Hospital and School. That future depends, in a very large measure on you. We are now very well established, and it is to you all we look to help us in keeping up our present standing. As a charitable institution, we are in a better position than we ever have been. As a school, the results of the pass examinations speak for themselves.

I am loth in one way to leave this chair, and yet not in another, as at our next meeting it will be filled by our old friend, Mr. Alfred Smith. This Society is to be congratulated in having him for its future President. It needs no voice from me to sing his praises. We all know him as a sound teacher, a genial colleague, and a jolly good fellow.

Gentlemen, the President is dead. Long live the President.

Mr. Greetham, as one of the old Students of the Hospital, begged to propose a hearty vote of thanks to Mr. Glassington for his services as President during the past year.

This proposition was seconded by Mr. J. W. Smith and carried unanimously.

The meeting then adjourned.

The last Ordinary Meeting of this Society was held on Friday, February 1st, at 8 o'clock. Alfred Smith, Esq., President, in the Chair.

The minutes of the previous meeting were read by the Hon. Sec., and confirmed.

Mr. Robertson was ballotted for and duly elected as a member of the Society, and Messrs. Francis and Vernon were proposed for membership.

CASUAL COMMUNICATIONS.

Mr. Glassington showed a case of attrition occurring in a root which he had extracted ; the specimen was remarkable in that there appeared to be no exostosis present.

Mr. Glassington also showed a lower canine tooth with two well-marked roots.

Mr. Harry Rose, who was unavoidably absent, presented the Society, through Mr. Jenkin, with a copy of his latest treatise on "Vulcanite Work."

Mr. Glassington proposed a hearty vote of thanks to the donor for his valuable book, and this was seconded by the President, who said that the work would prove a great acquisition to the College Library.

Mr. Alfred Smith then delivered his Presidential Address, which is published on page 206.

Mr. C. W. Glassington proposed a vote of thanks to the President for his very able Address, and during his remarks suggested that a sort of confessional might be instituted in connection with these Meetings, so that members could have the opportunity of reporting on their unsuccessful experiences.

The vote of thanks having been seconded by the Dean, was very heartily carried.

The Meeting then adjourned.

MANCHESTER ODONTOLOGICAL SOCIETY.

The usual monthly meeting of the above Society was held on Tuesday evening, the 8th January, 1895, at the Grand Hotel, Aytoun Street, Manchester. Mr. W. Dougan, the President, in the chair.

ELECTION OF HONORARY MEMBERS.

On the recommendation of the Council the following gentlemen were admitted honorary members of the Society, —Mr. E. Lund, F.R.C.S. ; Dr. J. P. Stallard, M.B. ; and Mr. A. Wilson, F.R.C.S.

Mr. C. R. Morley read a paper on "A New Method of Strengthening Vulcanite Plates," which is published on page 193.

The discussion was opened by Mr. JONES, who said that the subject was one with which they were all more or less familiar, inasmuch as it concerned the practical part of dentistry. Judging from the samples of the work exhibited by Mr. Morley he was of opinion that the method advocated by that gentleman secured increased strength and durability. Another advantage was that a uniform thickness of the plate was obtained, without having to resort to scraping. He might say that he (Mr. Jones) had worked on a somewhat similar plan for some years, and with great success. He could quite understand that Mr. Morley's method entailed a great deal of very careful manipulation, but the results justified the additional trouble.

Mr. TAYLOR exhibited a model of a case in which the mouth was abnormally large. The vulcanite plate was strengthened with gold, but not exactly after Mr. Morley's method. It was an idea of his own. Mr. Taylor afterwards fully explained his method of working to the members present.

Mr. CARRINGTON said he had been very much struck with Mr. Morley's method, and if that gentleman would only vouchsafe him an opportunity of seeing the work in practical operation he should feel inclined to adopt the idea in his own practice.

Mr. HOUGHTON thought that although Mr. Morley's idea was a good one, it was quite possible to get as good results by other means, and with the expenditure of considerably less labour. He should like to point out that it was essential in uppers to carry the perforated plate over the process, as otherwise the vulcanite had a tendency to break away from the alloy. He should like to ask Mr. Taylor whether he had ever used platinum gauze on his model.

Mr. TAYLOR said he did so for years until it got too dear.

Mr. D. HEADRIDGE said that no doubt most of them had to work largely in vulcanite, and it was necessary, therefore, to make their plates as strong as possible; and they had most likely adopted different methods at different times, some of which seemed to offer greater advantages than others. For his part he thought there was a great deal of disadvantage attaching to the use of piano wire, because of its tendency to become brittle during the process of vulcanizing. In the event also of its becoming exposed to the action of the air it became rusty, and was thus a source of weakness rather than strength.

Mr. P. HEADRIDGE said the tendency at present seemed to be to make plates too rigid. He thought the dentist should give more attention to making the plates flexible. In his experience he had never known a platinum plate come back broken. He thought that a flexible plate would give more during the act of mastication, thus being less likely to fracture, and also adding to the comfort of the patient. The fractures he had noticed had generally been caused through the bite not being properly adjusted.

After Mr. Morley had replied, the President thanked him on behalf of the Society for his interesting and practical paper, and the proceedings terminated.

THE EDINBURGH DENTAL STUDENTS' SOCIETY.

The Third Meeting of the present session of the above Society was held on the evening of Jan. 14th, Mr. Sewell Simmons, L.D.S., the President in the chair.

After the minutes of the previous meeting had been read and approved of, Mr. J. T. Jameson L.D.S., of Newcastle-on-Tyne read an interesting paper entitled "On the use of Gum-body in Crown Work." He had prepared many specimens of finished and unfinished crowns, and in passing these round for inspection, added many practical hints not contained in his paper. Mr. H. B. Ezard L.D.S., followed with a paper on "The Bichromate Primary Cell: how to make and use it as a Dental Motive Power." This paper was also illustrated and brought forth much discussion on the relative merits of different batteries.

Mr. Henry Blandy, L.D.S. has kindly granted the loan of his collection of dental advertisements for exhibition on March 4th., when a paper will be read entitled "The position of L.D.S., v. The Unqualified Practitioner."

The Fourth Meeting of this Session of the Edinburgh Dental Students' Society was held on the evening of Feb. 4th Mr. Sewill Simmons L.D.S., the President in the chair. Mr. S. W. N. Swales read a paper on "Methods of treating

and filling roots " which led to a good discussion among the members.

It is intended to hold the eleventh Annual Dinner on March 8th when Dr. Macdonald Brown, F.R.C.S., lecturer on Anatomy, Surgeons Hall, the hon. president elect, will occupy the chair. The menu card as in the past will be of a humorous nature.

Dental News.

VICTORIA DENTAL HOSPITAL.

The annual meeting of the supporters of the Victoria Dental Hospital was held on the 15th inst. in the Lord Mayor's Parlour at the Manchester Town Hall. In the absence of the Lord Mayor, the chair was occupied by Mr. S. L. Helm.

The eleventh annual report of the Committee of Management was as follows.—"The Committee have to record a satisfactory but uneventful year's work. A few structural and other alterations have been made at the Hospital, with a view to the greater convenience of those attending there, and have proved very satisfactory. Notwithstanding the great increase in the number of cases during the past ten years—viz., from 8,618 in 1885 to 15,191 in 1894,—and the removal to larger and more expensive premises, the subscription list has not shown a proportionate increase, and has, in fact, remained practically stationary, being in the past year only £97; and the Hospital has now an adverse balance at their bank of £170 12s. 9d. It seems hardly credible that the subscription list of a hospital in which, on an average, over 15,000 operations per annum have for some years past been performed, should be less than £100; but such, unfortunately, is the case. If, however, the Hospital is to continue in its present state of efficiency and usefulness, additional and increased subscriptions must be forthcoming in order to pay off the debt of £170 12s. 9d., and to meet the ordinary current expenses. It is the desire of the Committee to erect upon the site which they have already acquired a building

specially designed for a dental hospital, as soon as the necessary funds can be raised. Contributions in aid of this object are greatly needed."

The Dental Committee, in their report (read by Mr. Henry Campion), stated that during the past year arrangements had been made for extending the advantages arising from the use of anæsthetics. The number of children attended during the year was 4,301, and of adults 6,402, a total of 10,703.

Mr. F. W. Travers read the treasurer's report.

In proposing the adoption of the reports, the Chairman spoke of the advantages afforded to students by the Hospital. There was now no better centre than Manchester in which to receive an education in dentistry. Students began that education at Owens College and got the technical instruction at the Hospital. He regarded the advance and progress of dentistry as remarkable. Twenty or thirty years ago dentistry meant the extraction of teeth more than anything else. No consideration was given to the preservation of the teeth, which was nowadays one of the chief objects of the science. But he was afraid that even yet the old idea of pulling a tooth out and getting done with it had not been eradicated from the minds of some practitioners. He was afraid also that much injury was done by the appearance in our midst of so many charlatans in dentistry. The Chairman made an appeal to the public for the funds necessary to carry on the work of the institution.

Mr. J. R. Byrne seconded the motion which was passed.

Thanks were given to the Committee and honorary officers on the motion of Mr. H. Pilcher, seconded by Mr. W. Cogswell.

Votes of thanks were also passed to the Lord Mayor for the use of his Parlour and to the chairman.

NATIONAL DENTAL HOSPITAL, STUDENTS' SOCIETY.

At the next meeting to be held on Tuesday evening, the 8th instant, Mr. J. BLAND SUTTON will deliver an Address on "Tumours of the Jaw." Professional Visitors will be welcomed.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents]

To the Editor of the "British Journal of Dental Science."

Re NICE POINT OF LAW.

Dear Sir,—I should esteem it a favour if you will allow me space in your valuable Journal to state as briefly as possible the circumstances under which I was compelled to appear as defendant in the above case (which appeared in the last issue of your Journal). And as I am seeking a berth it would be detrimental to my future were the facts not known. In September last I answered an advertisement requiring a Mechanical Assistant for the Cape, and after some correspondence secured the berth. My references were taken up by a well-known dental firm (on behalf of the London Agents who engaged me), and I was given to understand I was going out to a qualified man; and moreover, he was described as such in the agreement which I signed in London. A few days after my arrival in the Colony, I discovered it to be a so-called London Dental Institute, and the man whom I had agreed to serve was only financing the same. A Hotel Broker was appointed Secretary, and a registered man was manager. A rider was added to my agreement which I refused to sign, and acting under the advice of a solicitor, I left the place, and was some time after summoned, as was stated in the last issue of your Journal. I could not secure another berth at the Cape, and am indebted to Messrs. Lindup, Johnson, and Barclay, dental practitioners in the Cape, for my return to England after my very unsuccessful venture abroad. Trusting you will insert these facts on my behalf. Apologizing for taking up so much space in your Journal.

I remain, yours respectfully,

J. DOWERS.

Kilburn, Feb. 23, 1895.

ANSWER TO CORRESPONDENT.

PUZZLED.—The use of the word "Dentist" on a door-plate under the circumstances mentioned, is illegal, provided the individual's name is not on the Dentist's Register. You can institute a prosecution independently of the General Medical Council.

Dental Hospital Reports.

WORK DONE at the Victoria Dental Hospital of Manchester,
during the month of January, 1895.

Number of Patients attended	707
Number of Extractions	499
Number of Extractions under Anaesthetics	120
Gold Stoppings	21
Other Stoppings	61
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	240
Crowns	2
Irregularities	31
Total	974

JAMES A. LEES, *House Dental Surgeon.*

APPOINTMENT.

Mr. Geo. N. Willis, L.D.S. Eng., has been appointed
Dental Surgeon to the East Dulwich Provident Dispensary.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
6. The Journal will be supplied direct from the office on PREPAYMENT of subscription as under:

Twelve Months (post free) 14s. od.

Post-office Orders to be made payable at the Langham Place Hotel Office to G. E. Skliros, 289 & 291, Regent Street, W. A single number sent on receipt of seven (penny) stamps.

British Journal of Dental Science.

No. 652. LONDON, MAR. 15, 1895. Vol. XXXVIII.

NOTES ON AMALGAMS.*

By C. S. TOMES, M.A., F.R.S.

Mr. President and Gentlemen,—The subject of the behaviour of amalgams is one that has for many years been to me very interesting, and so long as twenty-two years ago I read a paper upon it before this Society, establishing upon an exact experimental basis that, almost without exception, amalgams contracted as they hardened.

The experiments described in that paper were mainly based upon the specific gravity method of ascertaining what, if any, change of bulk took place during the process, and certain conclusions were reached as to the beneficial effects of the addition of gold and platinum to the alloys.

Since that time a good deal has been published upon the subject by Messrs. Fletcher, Kirby, St. George Elliott, Bogue, Foster Flagg, and others; but as it is not my purpose to do more now than detail the results of recent experiments of my own, and as this paper can have no pretensions to being anything more than a passing and incomplete contribution to the matter, any detailed reference to these papers, some of which have been of the greatest value, would be out of place, and, moreover, would take up more time and space than is at my disposal.

I will, therefore, only mention that while Dr. St. George

* Read before the Odontological Society of Great Britain.

Elliott, following out the same specific gravity methods, in the main confirmed my results some ten years later, Mr. Kirby laid much stress upon a change of form as well as a change of bulk taking place, and as I understand him, attributed even more importance to this than to actual shrinkage.

In my earlier experiments I found that palladium alone was free from this vice of contraction. As is well known, palladium is far the best of all amalgams in its practical results, but it is difficult to use, owing to irregularity in the behaviour of different samples, and also owing to its exceedingly rapid setting, which almost precludes its use in really difficult situations. Moreover, though it does not stain the tooth, it itself becomes of an inky blackness.

I allude to this because I think that it is quite possible that some of its merits are due to this rapid setting, by which it results that the filling is hard, and no further change has to take place after it leaves the operator's hands ; to this I shall have occasion to recur at a later stage of the enquiry.

My present series of experiments have been devoted, not to the improvement of the constitution of amalgams, but to the means of getting the best results with those in ordinary use, and they have for the most part been conducted with Eckfeldt and Dubois' standard amalgam, that being known to be a good one ; it contains, as is well known, tin, silver, copper and gold.

Previous experiments having satisfied me that Dr. Bonwill's method of inserting the amalgam fairly plastic, and squeezing it dry in the cavity by the repeated application of pads of bibulous paper, removing from time to time the softer portions into which the excess of the mercury had been squeezed, gave upon the whole the best results as to water tightness, this method was usually employed ; though a good many experiments were made with Mr. Kirby's method, viz., using decidedly plastic amalgam for the bulk of the cavity

and finishing with some that was very dry, the idea being that in this way the mercury would be most evenly distributed through the mass finally. In order that the experiments should compare fairly with one another, a great number were made in round holes about $\frac{1}{4}$ inch in depth, and one-eighth inch in diameter; these were bored right through slips of bone or ivory, which were clamped on to a flat surface of ivory whilst being filled, and then at once plunged into an ink pot (Draper's ink—condemned by Dr. St. George Elliott as being too severe a test—being usually employed); in every single instance I get more or less leakage. I began by packing amalgams (standard and flint edge) into cavities, and examining the surface under low powers of the microscope, and was a little surprised to find that no matter how dry the amalgam, and no matter how carefully it was burnished, the surface is soon covered with little hemispherical eminences; this applies not only to the original free surface, but to that which was in contact with the walls. But if it is burnished after it is set, these eminences are smoothed down, and the burnish remains.

It seemed possible that the leakage of fillings when subjected to the ink test might be due to this irregular surface, and so I tried lining the cavity with a film of No. 10 gold. This had the effect of getting a surface, where the gold had been, of a much finer grain, but the fillings failed as badly or nearly so as before. Moreover, I found that the fillings were not really a tight fit, but that they could sometimes be poked out through the holes without breaking the ivory slips, and that when these were broken, so as to leave about half the periphery, or a little more, the amalgam could be very easily dislodged from the remaining cavity. It seemed, therefore, clear that we had to do with a real shrinkage, and not with a surface too lumpy to make a water-tight joint.

Similar experiments were tried with tinfoil, and with a single thickness of heavier gold.

The great brilliancy of the little hemispheres when viewed by reflected light suggested that perhaps they consisted very largely of mercury, so I tried scrapings of the free surfaces and compared them with scrapings taken from the interior of the mass, with the result that, as might have been expected, from what is known of the mercury squeezing out to the surfaces, there was a much larger proportion of mercury here than in the centre of the mass, whilst during setting this was to some extent, but not wholly, redistributed.

I may mention also that I found that a fine surface against the walls was obtained by the use of a very fluid amalgam, so fluid as hardly to set, just such as is used in making a looking-glass, but this, of course, is no use for our purposes; if heavier gold was used it did not completely amalgamate nor, of course, did the compound gold and platinum foil become permeated through with the mercury. But still the ink test showed imperfect contact with the walls, and so I abandoned the idea that it was the granularity of the surface which was in fault.

I then tried lining the cavity with a thin, quite thin, layer of amalgam, and then filling up the rest of the cavity with Harvard cement, and now for the first time got an absolutely perfect result, thereby conclusively proving that the surface of the amalgam was fine enough to be water-tight, and that it was to shrinkage or change of form that its faults were due.

Experimenting further in the same direction, I found that it was possible to line the cavity thinly with amalgam, then fill up the great bulk of it with soft Harvard cement, and then coat the free surface with amalgam. This gave a very good result, so that we had here a plug the bulk of which was Harvard cement, with which there is never the smallest diffi-

culty in getting water-tight fillings, encased in a shell of amalgam, which would serve to protect it against any chemical disintegration by the fluids of the mouth.

So far, then, the tendency of my experiments seems to be in the direction of showing that amalgam was not, and could not be, a good material of which to make the whole of a large filling, but that its most reliable function would be to confer hardness and resistance to chemical action upon such materials as osteoplastics. So far, then, it seemed to point to the conclusion that no very large filling should ever be made of amalgam used in the ordinary methods.

It remained, then, to try what could be done in the much more awkward cavities which would occur in actual practice, the experiments having so far been conducted in cylindrical holes.

I found that there was not much difficulty in lining the bulk of a cavity with a thin layer of amalgam, filling it nearly up with Harvard cement, and whilst this was soft covering it over with a layer of softish amalgam—which, by the way, will adhere so well to the cement—while this is still sticky, that it need be but of very small thickness—indeed, I have since heard that Mr. Holford often uses it as a mere wipe over the surface of an osteoplastic filling with the view of protecting it somewhat from chemical action. We thus got a filling of Harvard cement encased all round with amalgam in so thin a layer that its contraction becomes insignificant, and good results are practically so obtainable.

I have been asked why line the cavity at all with amalgam. My idea was that the fluids of the mouth should at no point whatever get access, even in ever so small a degree, to the cement, which they would do if the cement cropped out anywhere, while, on the other hand, I was anxious that the thin layer of amalgam against the edges should everywhere be held up to its place by the setting of cement, and not of

a mass of amalgam which would be likely to shrink and alter a little in form.

It then occurred to me that it might be possible to embed something in the amalgam which, if it did not prevent its shrinking, might, at all events, compel it to shrink in some other direction than away from the walls, and with this end in view I made some rings of dental alloy, and others of steel, about pin wire size, and of such size that they, when laid flat in the holes, left only a small space between themselves and the walls. These were sunk in the amalgam, so that they just escaped showing on the surface. But although, perhaps, they effected a slight improvement, in spite of them the amalgam drew away from the edges enough to let the fillings leak, so after a good many trials I abandoned them as not so useful as I had expected.

Next I tried embedding a lot of pieces of porcelain tooth in the mass, distributed generally through it, and here again met with failure to get quite perfect results, and the same thing was true when I used pieces of old set amalgam.

Then I tried laying two or three thicknesses of bibulous paper in the cavity, filling with rather plastic amalgam, and withdrawing it before it was fully set; then, after keeping the filling thus made—which was, of course, a little small for the cavity—till it was quite hard, it was re-inserted with a small amount of fresh amalgam round it so as to fix it in place. This having been found to be rather impracticable, I tried fixing the loose filling in place by means of rather soft phosphate cement, smearing the actual edges of the old filling with amalgam somewhat soft, so that none of the phosphate cement should crop out at the edges.

In this way I was pretty successful in getting water-tight results, but it was a little difficult to manage. Still, I am not sure but that where we remove an amalgam filling which has

failed and become loose, we should not do better to use it over again in this way rather than to employ a large mass of new amalgam which has got all its shrinking to do.

If the amount of phosphate be well judged, but little will squeeze out, and it may generally be so manipulated that it comes out all at one side, where it can be scraped away and amalgam packed into the chink at this edge.

Of course there is no advantage in using a mass of set amalgam rather than any other indifferent substance, save only that it may be got so nearly fitting the cavity that there will be very little fresh amalgam round this edge.

So far, then, I had not met exactly with what was wanted, though I had learnt that it was possible by minimising the quantity of new amalgam to proportionately diminish the total shrinkage, and so to get a better approximation to water-tight plugs.

It is well known that a large number of amalgams which have already set will, like Sullivan's amalgam, soften again with heat, but they, or at all events, most of them, set again with great rapidity—in fact, as soon as they are cold.

Taking the standard amalgam, which, as containing some copper, seemed most likely to answer such a purpose, I softened bits of it in a Bunsen burner and rapidly rubbed them with a warm burnisher into some of the cylindrical holes. The result was an absolutely water-tight plug, but the rapidity with which it set rendered it very difficult if not impossible, to use it in average amalgam cavities, or to contour it. But I also found that if the cavity were filled up so as to cover up the edges, it was possible to go on contouring with freshly mixed amalgam without interfering with its water-tight edges, and so the question seemed to be to some extent solved. By putting on one of Mr. Lennox's admirable matrices, it was not difficult to do this in an accessible cavity, but the difficulty of the very rapid setting remained, which

rendered this of no avail in difficult positions ; and, moreover the high temperature of the pieces inserted would seem to limit its use to dead teeth, or to those thickly lined with an osteoplastic material. By adopting this method of using amalgam already set, and heated to soften it, a beautifully fine grained surface was always obtained, which retained its burnish although at once plunged into the ink, and the surface so obtained was wholly free from the spherical eminences which I noted as occurring with all freshly mixed amalgams. I have employed this method in the mouth in a few cases, using a matrix to render it easier to get it up to a contour, and with results which, as far as appearances go, look after a few days, most satisfactory as regards perfection of edge, &c., and I did not find it difficult, though owing to my inexperience, I selected cavities thoroughly accessible.

Since arriving at this result it has been pointed out to me that Dr. Otolengui, in his book entitled "Methods of Filling Teeth," advocates the use of fragments of previously hardened amalgam for the purpose of burnishing them into the surface of freshly inserted amalgam, obtaining by that means a rapid hardening of the surface. From my own experiments I do not doubt that he thus gains a material advantage, but my method differs fundamentally from his in that I would employ the old amalgam to line the cavity, and if I employ any freshly mixed it is upon the surface, and to build up the contour—in fact, it is in some sense the converse of his method.

The next step seemed to be—the difficulty of water-tightness being more or less solved—to find an amalgam which would, when re-heated, set a little more slowly.

I first tried increasing the proportion of gold in the alloy, but this had no effect in that direction. Next I tried copper, in the form of Sullivan's amalgam, though as Sullivan's amalgam does not fulfil all our requirements, I was reluctant to add much ; however, unless a large proportion of Sullivan

was added I found that the setting still remained too rapid for convenience. It next occurred to me that perhaps some freshly mixed amalgam might be added to the old heated amalgam without altogether losing the advantages which this seemed to offer ; accordingly, I added an equal weight of fresh amalgam, mixed so as to be thoroughly plastic, to a piece of heated old amalgam, and rapidly rubbed them together in a hot mortar. The mix thus obtained was pretty easy to pack into a cavity, though it sets rather too fast to be quite convenient. The resultant plugs proved to be generally water-tight.

I next tried adding double the amount of freshly mixed amalgam, and still was able to generally get water-tight plugs whilst there was ample time given for packing in a previously dried cavity. These experiments so far had been conducted with standard amalgam, which is itself a pretty rapid setter.

I then reverted to my old experiments of five-and-twenty years ago, and ascertained the shrinkage of the masses by the specific gravity test, with an exceedingly delicate balance ; under this test, which has to be used with a number of precautions into which I need not enter here, in order to get accurate results it was found that while standard amalgam does not shrink very badly, even when freshly mixed, the shrinkage is wholly absent in equal parts of old heated amalgam and freshly mixed amalgam thoroughly incorporated together.

There may have been a very trifling shrinkage in the first five minutes, but after that there was none, so that it may be assumed that no change would ensue after it left the operator's hands.

It really seems, therefore, that by this method of using this amalgam, perfect satisfactory results are attainable, and I then proceeded to try it in difficult cavities in actual teeth, in which I got again perfectly good results. I then took another

amalgam, namely, the flint edge, which under ordinary conditions does not give results quite so good as the standard, but was not so pleased with the results. It may be that the presence of some copper makes an amalgam reheated more workable. My own belief is that in order to get water-tightness in full degree it is quite essential that the setting should be rapid ; more rapid, perhaps than is wholly convenient.

Absolutely perfect results were usually got by using none but the old amalgam, packed in in a succession of small pieces but when this was done each piece set as fast as it was put in, and the plug was absolutely hard, and had no further changes to undergo the moment the plug was finished. Unless however, care is taken and the cavity be easy and accessible, there is a danger of imperfect cohesion between successive portions, and the same thing may be said of fillings commenced in this way and finished by the addition of new amalgam to contour. In these it was possible after breaking up the teeth and removing the plug to split the latter along the line of junction of the two kinds, although there was I think, ample strength for all practical purposes. Amongst other advantages, though that is a trivial matter, the method is very economical, for it enables the operator to use up every scrap of excess amalgam that he may have mixed up at any previous time.

To sum up the results :—

(1) With the exception of palladium it was found impracticable to get absolute water-tightness by any methods of packing in vogue.

(2) Perfect results can be obtained by making the mass of an osteoplastic, using the amalgam only as a protective agent, to keep the fluids of the mouth from having access to the plastic filling.

(3) Advantage, short of perfect results, can be got by diminishing the amount of fresh amalgam with its shrinkage

still to do, whether by embedding rings, lumps of hard amalgam or other foreign bodies in the soft mass.

(4) The larger the mass the worse the shrinkage ; no large filling should, therefore, ever be composed of fresh amalgam alone.

(5) Absolutely perfect results can very generally be got by using old standard amalgam heated and packed in small pieces, burnishing it well against the walls, but this is troublesome, and in some classes of cavity perhaps impracticable.

(6) In a large number of cases equally perfect results may be got with a mixture of new amalgam with old that has been heated to its softening point, and a beautiful finish can at once be got upon the plugs.

I am well aware of the very incomplete and imperfect nature of this communication, but it has seemed best to publish it even at this stage of the enquiry, for imperfect though it be, it represents the outcome of not a little time and a very large number of experiments.

I hope that it may contain, at least, useful hints, and that others who work upon the lines here laid down may soon test them and carry further the success which seems to promise.

I may mention that I have used the term shrinkage as covering also change of form, and I have not gone into much detail as to the actual experiments, as that would only be wearisome ; I have given the results rather than the means by which I have been led to them.

As practical hints in using amalgams after this fashion, I have found in large cavities the use of a matrix invaluable : I find that the easiest method of manipulation is to rapidly burnish a small quantity against the walls, then to take a large piece which will fill up the bulk of the cavity, and to finish by the addition of small pieces. If during the accomplishment of this, the amalgam has set, heat the final portions

just as though the whole filling were being made with old amalgam, and use hot instruments.

If the operator desires to use old amalgam for the whole operation, the best plan is to heat the whole lump in a spirit or Bunsen gas flame, and then lay it on a hot plate over the flame, so as to keep it soft. And as good results are only obtainable with a rapidity of setting which is rather inconvenient, it is necessary to dry and protect from moisture the cavity before mixing up or heating the amalgam mass.

Time alone can show whether amalgam so inserted will discolour a tooth, but the probability seems to be that a water-tight plug will not do so. For it is a familiar fact that palladium, the only water-tight amalgam of which we have long experience, does not do so, notwithstanding that its sulphide is black, and is freely formed upon its surface.

I should add that there is a certain fickleness in amalgams which seems to preclude absolute uniformity of result, and I have been now and again disappointed with the outcome of a particular experiment. Still I believe that the methods here suggested will give a far higher average of success than those in ordinary use.

And whilst it is true that a filling which is not watertight to the fullest extent will often preserve a strong tooth in a healthy mouth for a long time, yet it stands to reason that watertightness is a great desideratum, and the fact that when an amalgam filling fails we so often find its whole bed softened, seems to show that its adaptation was less perfect than that of the average gold filling which fails.

A correspondent, who writes to *Science Sifings*, draws attention to the fact that a Bradford dentist has sixty-thousand extracted human teeth, all in one heap, exhibited in his window.

DENTAL MECHANICS.
DENTAL LABORATORY.

By HARRY ROSE, L.D.S. Eng.,
Lecturer on Dental Mechanics, National Dental College.

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Continued from page 206.

TAKING IMPRESSIONS OF THE MOUTH.

The term impression is applied to the result of an operation, by which one obtains an inverted representation of the mouth and teeth in some soft material, such as wax, plaster, or composition.

The term model or cast will be used to mean a fac-simile of the mouth, obtained by pouring plaster of Paris which has been mixed with water into the impression and allowed to harden.

The advantage of having a correct model of the mouth to work to, is so obvious that one need offer no apology for dwelling on this subject at some length.

It is not everyone who is cognisant of the difficulties one meets with even in this preliminary operation, but that they are frequently brought home to us in a very practical manner, no dentist of average experience will attempt to deny.

The nervousness of some patients, the fastidiousness of others, and the stupidity of many more, is often the cause of a bad impression, and, as a sequence, an artificial plate that does not fit the mouth.

To overcome the objection of one's patients to this operation, it is incumbent to explain to them what one wants them to do. Above all, let them understand that the success of the future case depends upon them giving you every assist-

ance in this important undertaking, by keeping the mouth wide open, by remaining perfectly still and not attempting to talk, and by attending to your advice should they feel nausea, to draw in the breath deeply, in order to get the Soft Palate out of the way.

In taking the impression, one must be guided by certain rules, which are as necessary for the patient's comfort as for the success of the operation.

In the first place the impression tray should approximate in size and shape to the jaw for which it is intended. It should be slightly larger but still following the same outline, so as to admit of sufficient but not an overplus of the modelling compound. By following the curves or contour of the jaws it approaches more to a cup shape, thereby imprisoning the material used for the impression, and thus preventing its flowing or oozing away from the part against which it is pressed, and so ensuring a better and sharper impression.

Another consideration one must bear in mind, is to use as small an amount of composition, or plaster, as possible ; it allows of the tray being more readily tolerated. An excess of material, or a clumsy tray, especially in the mouth of a nervous or restless patient, is sure to be fatal to the success of the operation, nor is it to be wondered at, for the process is a most disagreeable one.

I would strongly advise every student to take one or two impressions of his own mouth, using an ordinary impression tray, and when he finds the material oozing out at the back part of the tray and slowly making its way along the soft palate and so into the pharynx, he will, after the four minutes which it usually takes to harden, have gained much experience ; and I am perfectly sure, at the same time will have firmly established in his mind a large amount of sympathy for any of his patients who have to submit to the same ordeal.

One cause of failure in taking impressions is the common idea that it is necessary to have a model of both the labial and lingual aspects of the teeth; this in the majority of cases is not required.

Let us see how this affects the impression, and in the first place it will be as well to observe the shapes of the teeth, especially in those cases where absorption of the gum has taken place and these are long and straggling (see Fig. 17).

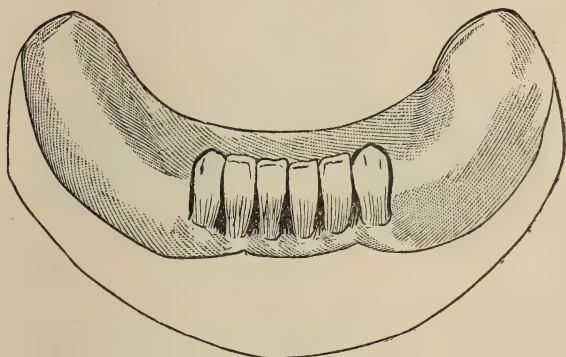


Fig. 17.

They will be found to present a series of cones with the broad ends represented by the points of the teeth. Now, when the impression compound moulds itself around the narrow necks of these teeth and hardens, one of two things must take place, either the teeth will be drawn out by the compound, or the material itself will be dragged out of shape. The latter, of course, is generally the case. Suppose, instead of having the tray to fit both sides of the teeth, we so adjust it that the lingual aspect only is taken (see Fig. 18), it gives one a much greater chance of getting a satisfactory impression being much more readily removed from the mouth.

One of our greatest troubles hitherto has been the length of time that it has been found necessary to keep the com-

position in the mouth, in order to insure its being sufficiently hard to withdraw, without fear of dragging it out of shape. This difficulty can now be overcome in a most satisfactory manner by using what is known as an irrigated tray. That

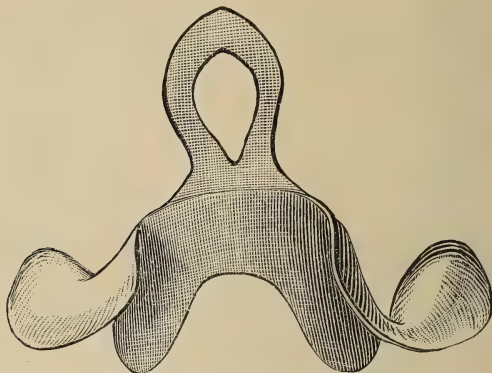


Fig. 18.

is, a hollow tray of German silver, through which a current of cold water is made to pass. Figs. 19 to 23 show the various parts of such a tray.

Fig. 19 represents the outside plate.

Fig. 20 the middle or intermediate piece, which may be either made of tin, German silver, or meter metal.

Fig. 21 represents the inner portion.

Fig. 22 is a piece of German Silver swaged to the front of the outside plate, and to which to the two handles should be fastened with silver solder in order to strengthen them. This should be done before it is soldered to the front of the outside plate.

Fig. 23 represents the two handles, which are made of hollow German Silver tube. With the exception of the small front piece D, the various pieces can be soldered with soft solder, of course omitting the middle portion B.

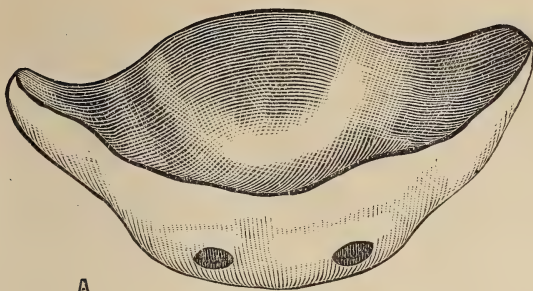


Fig. 19.

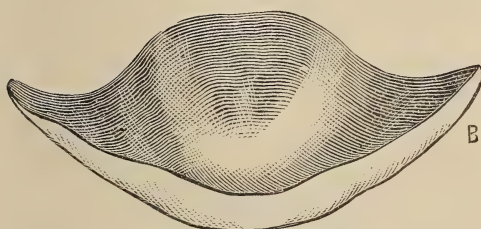


Fig. 20

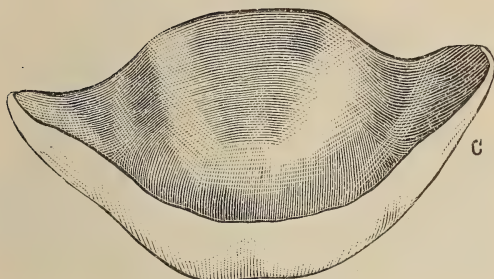


Fig. 21.

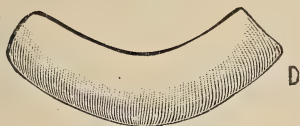


Fig. 22.



Fig. 23.

To prevent the solder from filling up the hollow in the centre of the palate, a layer of whitening may be painted over the inside of the inner and outer plates, corresponding to the size of the intermediate piece.

Fig. 24 represents the finished tray.

To one handle of the tray about six feet of india-rubber

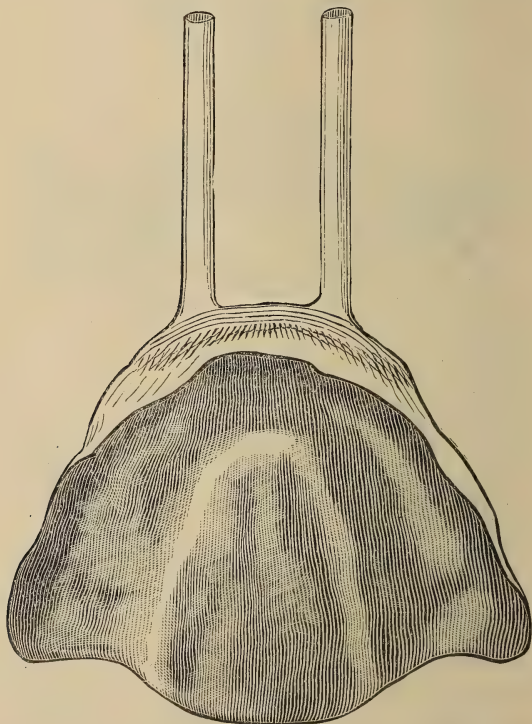


Fig. 24.

tubing are attached, the other end of the tube being slipped over the nozzle of a Plunket saliva ejector.

Close to the other handle of the tray is attached by means of a short piece of tubing, a little tap, such as is used on a face piece for filling it with air, and to the other end of the tap

is attached about six feet of rubber tubing, which is fastened to a metal tube soldered into the bottom of a tank, large enough to contain about a quart of water. This tank and the attachment to the tray to turn on the water, were introduced by Mr. Humby, and were needful to make the irrigated tray a success. The plate for making these trays should be about No. 7 guage.

The composition is inserted into the tray in the ordinary manner, the tank filled with cold, or even with iced, water, and the india-rubber tubes attached to the handles. The surface of the composition is then warmed over a spirit lamp and inserted into the mouth, and held firmly in position with one hand, while the small tap is turned on with the other. The effect is astonishing; the moment the cold water permeates the tray the latter becomes stone cold and hardens the composition in about one minute, so that it can be withdrawn from the mouth in safety.

This is a result that is appreciated both by the patient as well as the dentist. By the patient, because his period of suffering is soon over, and by the dentist because he secures the most accurate results with a minimum loss of time and anxiety.

It is perhaps the best advice to give and in the long run the greatest saving of time, to make a suitable tray for any mouth presenting difficulties, for we must not forget that the model is the foundation for our work, and however beautiful the superstructure may be, and however much skill and care may have been devoted to it, if the model is not correct, all that is thrown away and represents lost labour.

(To be continued.)

PUBLIC IGNORANCE IN DENTAL MATTERS.

By FORBES C. SCOTT, D.D.S.

In the majority of cases that come under our care for professional treatment, the ignorance displayed by patients about their teeth or matters relating thereto is generally remarkable, especially with regard to treating and filling them. Very often the following questions or queries are asked by our patients.

"I thought you always killed the nerve before stuffing (!) the tooth?"

"Are you going to fill it with lead or plaster of Paris?"

"Can't you 'screw' a tooth on to that root?"

Quite recently, a lawyer informed me that he thought he would have to have a "peg tooth" put on a stump he had in his mouth.

I just quote these few questions, so often put, as a few samples, and will confine myself for the present to them alone. We must, therefore, ask ourselves what is the *raison d'être* of this small amount of intelligence on matters relating to teeth. Some would at once probably suggest that it is the fault of the dentist in not properly explaining, or instructing his patients; others again would say that this state of affairs was due to the fact of the persons alluded to having scarcely, or ever, visited a dentist. To the former suggestion I am inclined greatly to adhere, and would propose a plan which I will detail further on for the possible remedying of the same to a certain extent.

As regards the latter assertion, that, I am inclined to think would not hold its ground, as many dentists can easily testify to treating patients who have teeth in their mouths treated and filled by various operators in various parts of the world, and yet these patients notwithstanding all the painful experi-

ence (or otherwise let us hope) they have been through, have a very faint idea of what is being done. Some will tell you that "Dr. Bogie," of Paris, did this tooth, and put up a red-hot skewer first, to "kill the nerve," and other amusing information will be given *ad libitum*.

One patient explained to me once, the way her tooth had been "filled by electricity," the instrument picking up the gold and filling the tooth. Needless to explain that the Bonwill mallet had been used.

With these few preliminaries, so as to enable the reader to form some idea of what is wished to be implied, and what is, in a great many cases, found to exist, I will now pass on to a sketch of a "modus operandi," to probably enable some of us to diffuse a certain amount of elementary knowledge amongst our patients and thereby save endless explanations and long controversies, when they suddenly call upon us and when, in many cases, we are full of work, and every minute is precious. So that when the servant says, "Mrs. — wants to say one word (?) to you," it shall literally be so, and not half an hour's long talking and fidgetting.

In the first place then, popular free lectures should be got up, and these should be made interesting and humorous, with dry details avoided, and plenty of lime-light views thrown in. They should be of a purely elementary class, and all technicalities left out; too much "dentine" and "cementum" would frighten half the audience, and above all, any reference to any set way of filling must be avoided. Then again, the Dental Colleges should open their doors every now and then, and have a conversazione and views of the various diseases that teeth are "heir to" exhibited; this, of course, is with regard to the public.

In private practice a concise treatise on the human teeth should be handed to heads of families; this should be of a most simple type containing diagrams easily understood by

the uninitiated, and after leading off with a plain but not too verbose explanation of the teeth, their number, and when to look out for them, etc., should then have a few lines on the "nerve," and its situation in the teeth, and ending by a few simple remedies in case the patient lives away from dental aid, or to use until a visit can be made, in cases of extreme suffering. Above all, any kind of "panacea" should not be mentioned, and anything whatsoever flavouring of a "boom" for a certain remedy or person should be strenuously avoided, as in this case it would become a detestable advertising pamphlet, and would thereby find an ignominious death in the fire as an empirical production. I heard of a certain professional man who once brought out a careful treatise on the teeth and their general hygiene, but unfortunately he quite spoilt the meaning of it by introducing a few lines about certain mouth washes, etc., that he could supply if necessary. The result was that he lost a good deal of caste amongst his *clientèle*, notwithstanding the fact of his possessing the highest dental and medical diplomas.

To sum up, with these few means I have suggested, I believe a great deal might be accomplished and things made much more agreeable for all parties concerned, besides probably being the means of bringing many to seek our aid who now keep away until they are in pain, or until a breakdown occurs.

VASOMOTOR REFLEXES IN SOME NERVOUS CONDITIONS.—Hallion and Comte find that the vaso-constrictors do not act in an area which is anæsthetic in consequence of a nerve-lesion. On the other hand, they act normally in hysterical anæsthesia. Vasomotor phenomena remain quite unaffected by the hypnotic state. In syringomyelia, they are feebly developed or quite absent, even in parts where there is no anæsthesia.—*Glasgow Medical Journal*

British Journal of Dental Science.

LONDON, MARCH 15th, 1895.

AMALGAMS.

THE history of the battle waged against the use of Amalgam for filling teeth forms one of the most instructive features in Dental Literature. When we recall the fact that at one time no practitioner who insisted upon stopping teeth with this material, was eligible for admission to a Society of his fellows, and when we find it recognised to-day as one of the most valuable aids in practice, an object lesson is surely presented for the benefit of those who are too much inclined to arbitrarily declare in favour of their own ideas to the exclusion of others. Even now we believe it would not be difficult to find instances of practitioners declaring they do not use Amalgam in their practice. The main objections are that it undergoes a change of form, that its colour is objectionable, and that it is liable to stain the tooth tissue. All these may be modified by proper care in manipulation, and by selection and proper preparation of cavities; and those who claim to adapt the best stopping to the particular case in hand (not overlooking the personal equation of the patient) will welcome anything added to our knowledge of Amalgam.

Under these circumstances the communication made by Mr. TOMES at the January meeting of the Odontological Society of Great Britain, and published in the present number of the JOURNAL, is one of great interest, and should also do much to appease the appetite of those members of the Society who crave for something satisfying and "practical," rather than the strong meats of scientific investigation. To our minds, however, the paper happily combines

both aspects. The experiments described are exact as far as they go, and no attempt was made to stretch the facts to unlimited application of Amalgam filling. On the other hand it furnishes an inducement to those who have not tried mixing old and new Amalgam together. We are, however, prepared to find that many have been accustomed to use up "waste" masses of Amalgam, not from motives of economy but in order to reap any advantage which may possibly accrue from the employment of old material, which has already passed through the changes which take place in the mysterious process of "Amalgamation." We have ourselves been in the habit of so utilizing "waste" for mixing with a freshly-prepared mass, or merely as a finish. It is also of use in "combination" fillings with the cements, and can be employed as a facing for it presents an extremely hard surface which can be burnished before the patient leaves. Whilst not entering more fully into the subject, we would suggest that a trial should be made of old powdered Amalgam; that is to say, a mixture which has been allowed to set, is re-heated, finely powdered, and kept in that condition ready for use.

DENTAL ATTRITION.—Dr. Wilberforce Smith has recently read a paper before the Anthropological Institute, in which he gives the results of an examination of the teeth of ten Sioux Indians. Accustomed as he was to the mouths in a modern civilized community, the jaws and teeth of Buffalo Bill's Indians were startling in their perfection. Dr. Smith had previously recorded the results of examining 300 consecutive cases of dwellers in London, so far as premolars and molars were concerned, and taking these not as individual teeth but only as they formed opponent pairs; and he makes a comparison between the Indians and the Londoners. The four younger Indians had an average of five opponent pairs of molars; against these the average of nineteen London inhabitants had just half the number, 2.50. At the older

period the Indians had an average of 5.5 molar pairs against 1.12. One characteristic feature was the disappearance of the cusps from wear, and Dr. Smith applies the old adage that "it is better to wear than to rust." He alludes to the way our molars are artificially preserved from wear, but thinks that the details of attrition processes capable of levelling down tooth-crowns are not yet sufficiently made out.

A NEW DENTAL JOURNAL.—We have on many occasions found ourselves obliged to refuse the insertion of certain advertisements in the pages of this JOURNAL, and twice recently have, in consequence, been threatened with a new Journal as a competitor. In the first instance, a few months ago, an advertisement was sent us, by an Association, for a number of insertions, but on account of its reflecting upon the action of the General Medical Council, and the British Dental Association, etc., we refused to accept it. Our motto is still "Independence and Liberality." but on no account could we allow anything to appear in the JOURNAL unduly reflecting on a person or a corporation. The result in the case mentioned was the receipt of a letter of a threatening nature containing a remark that most likely our refusal would lead to the starting of another Dental Journal. In reply we said it would give us great pleasure to see more such periodicals to stimulate the Profession. Again, three weeks since, we received and refused an advertisement from another Association, for a year's insertion. We understood these two Associations were entirely distinct and had nothing in common with each other; yet in answer to our refusal we were told, "It may be the means of another Journal being issued for the Unregistered Dental Practitioners' Defence Association." We replied, "We shall be pleased to welcome any new Dental Journal devoted to the interests of the Profession; we never have been and never shall be jealous of any Dental Journal, but on the contrary, should be pleased to see a dozen of them." For whatever advantage thus resulting to the literature of the Profession, if

such Journal appears, we may therefore perhaps lay claim to some share ; and, in the hope that its reading matter may add to the sum total of Dental knowledge, we extend a welcome to the enterprise.

ANGINA LUDOVICI.—The Sheffield papers contain the report of an inquest upon the body of a man who died during an operation for cellulitis of the neck. The patient had suffered for a fortnight from toothache, and there was such swelling of the lower jaw and neck as to seriously interfere with respiration. On admission to the hospital it seemed as if he might suffocate at any moment. The tongue was pushed to the roof of the mouth and swallowing was impossible. Chloroform having been administered, an incision was made into the swollen neck. Respiration became very laboured and tracheotomy was therefore performed. This only afforded temporary relief and the patient succumbed. Attention has recently been called to the tendency which seems to exist in "lower molar abscess" for purulent infiltration of the loose tissue in the neck, and one medical man suggests that the inner alveolar margin is on a lower level than the outer, and that when pus has found its way up the side of the root, it drains downwards into the soft tissue in the floor of the mouth.

ANÆSTHETICS AND VENTILATION.—At a meeting of the Liverpool Medical Institution, Mr. C. G. Lee alluded to the spasmodic cough and laryngeal irritation which often affected the operator and assistants in badly ventilated rooms. It seems that when chloroform (and according to some, ether also) is employed under such conditions and in proximity to a gas flame, a certain deleterious substance is formed. Dr. Paterson has suggested that the irritating matter is due to the formation of carbon oxychloride or phosgene gas, whilst Dr. Carter thinks it may be partly due to free hydrochloric acid. In Mr. Lee's cases the patient did not suffer, but in another recorded case, both the patient and the operator suffered so much from the violent cough that it was considered dangerous to proceed with the operation.

A DENTAL HOSPITAL FOR INDIA.—Lord Harris has recently completed his term of office as Governor of Bombay, and it appears that a “Memorial Fund,” of something under forty-five thousand rupees has been raised. “KHORSHED” writes to the *Times of India* suggesting to the energetic organizers of the Fund that instead of having a marble statue erected in his Excellency’s memory, a Dental Hospital should be built to be called after the ex-Governor. This seems to us a good idea, and we shall be glad to hear that the subscribers concur. KHORSHED says:—“It is rather curious that this long-felt want has not as yet attracted the members of our Medical Profession nor that of our philanthropic citizens.”

Manipulative Miscellany,

It is requested that all new instruments or articles which it is wished to have described under this heading, be sent *for inspection* to the publisher not later than the 8th and 23rd of each month, they can be returned in a few days. Where, from the size or otherwise, this is impracticable, a clear and minute description will be sufficient; the sole object being to give practitioners a description of everything new, on its own merits and without any intention or wish to pit one against another. All makers, vendors, and inventors, are invited, with strict impartiality, to contribute towards this end.

UNIVERSAL CROWN AND BRIDGE IMPRESSION CUPS.

We have received from Mr. Herbert F. Hill a specimen of an impression trough, which, by being moveable upon the handle, can be adapted to any part of the mouth. They are made by Messrs. Ash & Sons in three sizes, and are of a suitable shape and dimension to take the necessary quantity of Plaster or Composition, thus avoiding filling the mouth with material that is not really required for obtaining a model of a root and two or three teeth.

Abstracts of British & Foreign Journals.

THE RELATION OF NITROUS OXIDE AND ASPHYXIA.

By Dr. W. W. BELCHER, Seneca Falls, N.Y.

From the day of its discovery it has ever been a mooted question whether or not this agent was a true anæsthetic or an asphyxiant. To the unprejudiced observer it would appear that the discussion, *pro* and *con*, has been decidedly in favour of the idea of asphyxia. Numerous dissections of persons dying under the influence of nitrous oxide, and many domestic animals sacrificed for the benefit of science, have tended to confirm this view. The medical profession have accepted it as an established fact; to a large number in the dental profession, however, it is still an open question.

In discussing this agent, it is claimed by the advocates of true anæsthesia that there is an atomic separation of the elements of nitrous oxide, and that free oxygen and nitrogen each exert a special influence in the production of the anæsthesia; in short, that nitrous oxide produces its effect by an overstimulation, an excess of oxygen in the system. On the other hand, the possibility of a separation of the elements of the gas at the normal temperature of the blood is positively denied; the nitrous oxide giving up no oxygen to the blood or tissues, the gas becoming rapidly diffused and replacing the oxygen in the lungs. Some writers go so far as to claim that this is not only true of nitrous oxide, but of all anæsthetics; the agent, whatever it may be, gradually replacing the air in the lungs, and a state of asphyxia resulting. But when fifteen per cent. oxygen plus eighty-five per cent gas is given, the blood preserves its normal amount of oxygen.

It is generally admitted that in producing unconsciousness nitrous oxide gives many of the symptoms of asphyxia. The quick and laboured breathing, the increased rapidity of the pulse, the capillaries surcharged with discoloured blood; the purple, aye, the black condition of the features under prolonged anæsthesia,—these are all symptoms of asphyxia. We are all anxious to consider nitrous oxide as absolutely harmless.

To be sure, there have been comparatively few deaths, and it cannot be said that every death is due to the anæsthetic. Sudden and unaccountable deaths during surgical operations were not unknown before the advent of anæsthesia.

In the course of a series of interesting experiments to determine the effect, if any, of the will power and physical condition on the amount of gas necessary to produce the anæsthetic effect, I was tempted to try the experiment of breathing and re-breathing the same air. For this purpose an ordinary gasometer was used, the air being expired into the holder and taken again into the lungs. The effect and the similarity of the symptoms to those of nitrous oxide were, to say the least, surprising. You will find yourself slowly losing control of your actions ; a numbness stealing gradually over you ; the sounds are re-echoed. At first you would dearly love to take a full breath of air ; *now*, it is a matter of indifference whether you breathe the fresh air or the contaminated atmosphere, which seems to be thick, a substance to be weighed and measured. A few more inspirations, and you are unconscious. I have done this not once, but many times.

Every sensation was identical to that produced by the inhalation of the gas, even to the stertorous breathing. It is not claimed that producing unconsciousness in this manner is either new or novel. Indeed, it is most ancient, the inhaling of carbonic acid having been used by the early Egyptians to produce unconsciousness. It is no more or less than carbonic acid poisoning. Speaking in the generally accepted meaning of the term, it is none the less asphyxia.

Asphyxia may be confounded with apnœa, suffocation, syncope, shock, dyspnœa, and other disorders of respiration. Poisoning by toxic vapours, the fumes of sulphurous acid, mephitic gases in general, and those produced by burning charcoal (carbonic oxide, CO) do not constitute asphyxia in the literal acceptance of the word. They are, in fact, true poisons resembling narcotic poisoning. As another interesting experiment, turn into the gasometer a small amount of nitrous oxide, say a gallon or two ; breathe the same until the gas is consumed. Breathe next into the gasometer, breathing the same air over and over. You will have without interruption a continuance of the anæsthesia, and exactly the same train of symptoms as with the nitrous oxide alone. Try still another experiment ; breathe the same air over and over as before. When you begin to feel the effect, turn a small amount of nitrous oxide into the gasometer. You will find

that oftentimes one gallon is sufficient to produce unconsciousness ; all the symptoms, the effect, absolutely the same as when nitrous oxide alone is employed.

I do not expect that the inhaling of an atmosphere surcharged with carbonic acid will ever take the place of nitrous oxide. The gas is far more pleasant in its action ; it must possess other virtues that make its asphyxiating effect more pleasant, a most charming method of smothering. That, its nature being asphyxiating, it is dangerous to any one having heart or lung trouble, no one will deny. Another fact : it takes much less effort to produce unconsciousness when gas is employed late in the day, when the vital forces are low, and the patient will complain of "an all-tired-out feeling" and you will find two-thirds the amount of gas usually employed sufficient.—*The Dental Cosmos*.

CONGENITAL RICKETS.

Townsend, of Boston (*Archives of Pediatrics*, October, 1894), reports a case of rickets in which the rickety changes occurred *in utero*. The child's parents were young, well formed, and healthy, as were the other children in the family. During the time the mother was pregnant the family suffered much from poverty, the father being out of employment. The mother had, on this account, much mental distress, besides being insufficiently nourished. The birth occurred one month before the time. The child weighed seven pounds, and was fourteen inches in length. The head was large, square in front, and much flattened behind. Ossification in the skull bones was very deficient. There was much flattening in of the chest laterally. Marked beading of the ribs giving rise to the characteristic "rosary." The abdomen was very large. On palpation, the liver could be felt beneath margins of ribs, apparently not at all enlarged.

The extremities showed marked signs of rickets by (1) enlargement of appendages, (2) curvature of the long bones, and (3) numerous fractures. Complete fractures existed at birth of both tibiae, of the left humerus, and of both bones of the forearm on the right side. Both epiphyseal enlargements and curvatures were marked in degree. The child was fed artificially, but died on the ninth day. No autopsy could be obtained.—*The Canadian Practitioner*.

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary monthly meeting, January 14, 1895. Mr. Frederick Canton, M.R.C.S., L.R.C.P., L.S.A., L.D.S., President, in the chair.

The Minutes of the last meeting were read and signed as correct.

The following gentlemen were ballotted for and elected members of the Society:—John William Pare, M.D., C.M. Edin., L.D.S. Eng., 18, Portland Place, W. (resident): F. E. Davar, L.D.S.I., Church Gate Street, Fort, Bombay, India (non-resident).

The following nominations were proposed to the Society for resident membership:—A. E. Baker, M.R.C.S. Eng., L.R.C.P. Lond., L.D.S. Eng., 22, Grosvenor Street, W.; Percy Francklin Henry, L.D.S. Eng., 79, King William Street, E.C.

The following nomination was proposed to the Society for non-resident membership:—Ridley Herschell, L.D.S. Eng., 6, Seaside Road, Eastbourne.

The CURATOR announced the presentation, by Mr. Kölliker of Zurich, corresponding member, of a set of photo-micrographs of human teeth, which had been taken and published by Dr. Röse and Dr. Gysi.

The LIBRARIAN said he had only to report the reception of the usual exchanges of periodicals.

Mr. J. J. ANDREW described a case of odontome of the upper jaw. The case was, he said, one of great interest. He had the opportunity of examining this odontome through the kindness of Mr. J. Royston, who obtained it from Mr. Rushton Parker, of Liverpool, who operated for its removal. Mr. Parker stated that the patient, D. M., aged 17, noticed a swelling of the right upper jaw about April, 1893, preceded by toothache. After two or three days of pain, he had the second bicuspid removed, and the swelling diminished slightly. When seen by Mr. Royston the odontome was recognised, and he was sent to the Royal Infirmary to have it removed. The cheek was prominent and the alveolar border greatly widened, with an ulcerated opening through which the odontome could be seen exposed and bare, undergoing necrosis at that spot. The patient being put under chloro-

form in June, 1893, the odontome was removed by means of periosteal raspatories, and in this way it was dislodged in a few minutes without any cutting of the soft parts or fracture of bone. The cavity left was found lined with granulations and lymph, indicating the inflammation which had previously existed. It was treated with a little cotton dipped in whisky and water, which was also used as a mouth-wash for antiseptic purposes. The odontome measured one and a half by one and a quarter inches, of irregular shape, and bearing evidence of having arisen in two teeth, the first and second molars. No elevation of temperature resulted, or other interference with the patient's health, and after five days in hospital he went for a fortnight's holiday in the Isle of Man, being directed to wash his mouth and the alveolar cavity with borax and water. On his return there was still a large hole and distinct prominence of the cheek. He returned, however, to his work as a railway clerk. On further inspection in May, 1894, eleven months later, there was no further prominence of the cheek or other deformity. In the alveolar border there was now only a small pit or crevice, in the bottom of which the wisdom tooth could be seen. Mr. Royston, in his notes on the case, states that he was first asked to see the patient at the Liverpool Dental Hospital by a student, it being supposed that the trouble arose from a bad root. He found the face much swollen, also the mouth, with a slight discharge on the gum. There was no antrum trouble discoverable, but a curious-looking mass projected through the gum in the molar region, slightly movable and apparently large. Diagnosing an odontome or some unusual condition, he sent the patient on to Mr. Rushton Parker for advice or operation, first taking an impression of the mouth. A few months after the operation another impression was taken by Mr. Royston, and a third only a few days since. These models were now exhibited. After the last impression was taken, as the wisdom tooth was of no use and causing some irritation, it was extracted. This tooth, which he now exhibited, showed that one of the roots was quite folded on itself, though otherwise the tooth was well developed. A case like this was rather a strong point in favour of each tooth being developed from a distinct and separate tooth germ, and not, as they had a long time held, from a branch given off from one of the earlier molars. When he (Mr. Andrew) got the odontome it was dry, all the soft tissue gone; it was more or less oval in shape, rough, with

numerous depressions and projections on its surface. One large projection which showed through the gum on the opposite side was one main foramen filled with soft fibrous tissue. Its length was $1\frac{5}{8}$ inches; girth, $4\frac{1}{2}$ inches; width, $1\frac{1}{4}$ inches. He omitted to weigh it as a whole, but as the remaining small half weighed 190 grains, the whole odontome must have weighed about 500 grains. The large half was cut up for microscopic examination, sections being made in various directions. The odontome came in Mr. Bland Sutton's classification as "No. 7, composite odontome," the old classification being, "Bulbar odontoma." The structure was shown to be complex and very mixed; in parts, labyrinthine or folded in appearance; in others, osteo-dentinal. The main body of the odontome was dentine, though of a very irregular character, full of openings and canals, with patches and crescents of enamel in all kinds of positions scattered through it. There was very little cementum, but a few lacunæ occurred in parts. Mr. Andrew illustrated the communication by a number of photo-micrographs shown on the screen.

Mr. S. J. HUTCHINSON asked Mr. Andrew whether he was prepared on the very complete exhibition he had just given of sections of this odontome to abandon the theory that the first, second, and third permanent molars were descendants one of the other, and of the second temporary molar. If so, this was even more important than the very admirable illustrations which had been given. It was one of the most debated points at the present moment in dental physiology, and if Mr. Andrew would give his opinion on the point, as he had already done on a former occasion, they would probably learn something from the pathology of these particular cases which might help them with regard to the physiology.

Mr. ANDREW said he was not at all prepared to abandon the theory, which was rather a pet notion of his own, as to the development. Some years ago he thought he had a good example of it, and showed it to Mr. Tomes; in fact it was one of the things that almost persuaded Mr. Tomes to go back to his original love in that direction. Some of the American men were very strong on the theory that each tooth was developed from a separate germ, and they thought they had proved their point. The wisdom tooth which he had shown was one of the strongest points in their favour which he had himself seen, but he was not quite prepared to abandon the other notion.

Mr. MANSBRIDGE described certain methods of antrum

drainage, and said there were two methods that he found useful in treating certain cases of drainage in antrum trouble, and he thought the suggestions might be useful to some members of the Society. In order to minimise the risk in such cases of food or other foreign bodies being forced up into the antrum, he had adopted the plan of soldering at the lower end of the tube another piece at right angles, thus having the opening towards the cheek, and providing a drain without the risk of the food being forced up. A case, however, presented itself, in which communication between the palate and the antrum was exceptionally sensitive, the patient could hardly bear the pressure of any foreign body against the sides of the canal. The opening also ran obliquely upwards and inwards, therefore a rigid tube was difficult to adjust without producing a certain amount of pressure on the walls of the opening, which was difficult to overcome. In this case he adopted the plan of making the tube separate from the plate, having a small piece of metal stamped and soldered to the tube to prevent it slipping up; this being *in situ*, a second impression was taken and a vulcanite plate made to cover the opening of the tube. In this way there was no possible chance of food being forced up into the antrum, and the patient was able to syringe the antrum through the tube, with the tube *in situ*, simply by removing the plate two or three times a day. He produced a model showing the tube and plate in position.

The second case was one that occurred in hospital practice, in which the opening into the antrum was very high up on the outside of the gum. As the outer side of the opening was closely impinged upon by the cheek a rigid tube fixed to a plate would have been out of the question. In this case he adopted a movable tube, the opening being made at the side, so that all chance of food getting forced up was obviated. He produced a model with tube and plate *in situ*.

Mr. BADCOCK said he had abandoned the use of the tube altogether, finding that it had not all the advantages that it was thought to have in the way of drainage. It certainly would give access to foreign bodies in the way Mr. Manbridge had suggested, and he was not sure that it made a very efficient drain, seeing that they might either get the end of the tube a little beneath the level of the floor of the antrum, in which case there was a tendency for the opening to close in that position; or they might get it too high, when, if there was only a slight accumulation to be drained, it would

not rise over the edge of the tube and so properly escape. They were somewhat difficult to keep clean. He suggested that a solid plug could be easily introduced, taken out, and much more easily kept clean. If the plate was removed from time to time the antrum could be syringed and the opening maintained by the plug. In cases where it was difficult to insert a plate and a plug in one piece, he often made a separate plug which was attached to the plate by means of a little ligature, and worked very well.

Mr. MANSBRIDGE said he quite agreed as to the solid tube acting well in certain cases, but, in the particular case he noted, where the canal between the mouth and the antrum was so exceedingly sensitive that the patient could not bear to take anything in or out, he found it very useful to syringe through the fixed tube. No discomfort at all was felt from the presence of the tube.

Mr. TOMES then read a communication entitled "Notes on Amalgams," which we publish on page 241.

DISCUSSION.

Mr. VAN DER PANT asked Mr. Tomes what amalgams he used.

Mr. MANSBRIDGE asked if Mr. Tomes attached any importance to mixing amalgam in the hand, and whether it could affect the ultimate result. Also, whether there was any disadvantage in squeezing out any excess of mercury before filling, or whether it was better only to use just the amount of mercury required.

Mr. W. COFFIN asked if Mr. Tomes had been able to formulate any idea in his mind as to what really happened when an old hard amalgam was melted by heat. He had spoken of its being "decomposed," by which he could not mean decomposed into its original constituents, otherwise, upon hardening again it would have to go through the same processes, whatever they might be, and the result would not be the very rapid hardening that they knew took place. There was, he presumed, a suspicion that amalgam consisted of one chemical compound between mercury and one or other of the metallic constituents more or less mixed, absorbing each other, or crystallising each other, and of course the idea would suggest itself that the so-called decomposition by heat was really a resolution into a new series of definite chemical compounds which either combined or redissolved and crystallised in each other

with great rapidity. He had tried to make some investigations upon the point, but with very incomplete, puzzling, and wholly inconclusive results. But if they could be taken in a direction of separating the more fluid and the less fluid portions from each other upon melting the amalgam, one might arrive at some method of producing first the chemical compounds and keeping them apart until they wished to produce the result that was obtained by heating. He imagined that by producing a liquid compound—and two or three were known to exist—a definite compound of mercury and one or other of the metals, they would be able to secure a perfectly definite result as to the final compound and its physical properties. At present the great difficulty was in getting always the same physical result in mixing amalgams, even with the greatest care and accuracy. The paper had been most suggestive, and was full of a number of points from which many of them would no doubt try to make new departures.

Mr. W. HERN asked whether the ratio of the surface of a filling to its depth made any difference in the contraction of the amalgam. It seemed that when one had to put in a shallow filling in a large area the edges of the cavity had not been so good after a lapse of time as with a filling which had been put into a cavity of considerable depth with a small area.

Mr. BEADNELL GILL said that Mr. Tomes had stated that towards the end of his experiments he found a great many unaccountable failures. He should like to ask if he noticed whether he invariably mixed his amalgam in his hand after using the mortar, and if so, whether there was a difference in the condition of the hand on one occasion to what there was on another. He had noticed on some occasions when tempted in a hurry to rub the amalgam in his hand, that sometimes it yielded very good results packed as dry as he could possibly squeeze it in wash-leather with pliers. On the next occasion, having done exactly the same thing with exactly the same amalgam, he had found that it would not work. He put this down to the fact that his hand on the latter occasion probably had some moisture that was conveyed to the dry amalgam and brought about the failure. He had, of late years, invariably adopted the other practice, and had reduced the number of his apparent failures.

Mr. E. LLOYD-WILLIAMS said the thanks of the Society were due to Mr. Tomes, more especially because he had brought home to them the fact, which perhaps none had fully

realised, that under ordinary conditions, and even with the exceptional methods which had been referred to, such as those of Dr. Bonwill and Mr. Kirby, a very large majority of amalgam fillings in anything like large cavities would fail after they had been in the mouth four or five years. He heard a few murmurs behind him, and did not for a moment expect that members would entirely agree with him. There were no doubt other considerations which could not now be gone into, as to why a large proportion of those amalgam fillings which he had called "failures" still did duty in preserving the teeth. It was a long subject to go into, and he would not dwell upon it, but he was perfectly certain that any careful series of experiments would prove that a very large majority of amalgam fillings put in in the ordinary way would fail after the period he mentioned. He was therefore very glad that the subject had been brought forward, and having had the privilege of an early perusal of the paper, he had only as late as that afternoon tried a very small series of experiments, though in a very rough and ready way. Finding that Mr. Tomes advocated a plan of mixture of old amalgam, which was softened by re-heating and mixing up in a mortar with a mix of new amalgam, he took a good old specimen which he found in his drawer, a monument of somebody's skill, probably his own, which had failed, and failed very badly, and heated it up on a hot plate over a spirit flame. He had not the remotest idea what amalgam it was, but he added to it an equal part of a medium mix in a tolerably plastic condition of Flagg's submarine amalgam. He tried to get this into a cavity, as it was stated in the paper that this would not be a very difficult matter; but although he had two very tiny cavities in the surface of a molar, and although this operation was performed out of the mouth, he still found a great deal of difficulty in getting the two little plugs packed in before the amalgam set. In fact it was in a powdery condition almost before he got it into the tooth, but after it was in, and it was burnished down, the results seemed to be very good. The second portion of the same amalgam was heated up on a hot plate and meanwhile an ordinary mortar was heated up. He took another mix of submarine amalgam, a little thinner than the last, mixing it in the hot mortar, and he certainly found that one had a much longer time to manipulate the fillings. He thought that for flush fillings that could easily be kept dry, a good deal of use would be found for this method of putting in amalgams, but he was not nearly so

hopeful as Mr. Tomes appeared to be that contouring was to be done quite so easily. He believed that in cavities difficult to keep dry, and in inaccessible positions, it would be found extremely difficult to pack the amalgam carefully, even with the aid of a good matrix. Mr. Tomes had found some variation in his results. He (Mr. Lloyd-Williams) would like to suggest that perhaps there had been variation first of all in the quantity of mercury originally mixed with the amalgam; that secondly there had been a variation as to the temperature applied to the amalgam over the spirit flame; thirdly, that there might have been a variation in the quantity of mercury added to the fresh mix; and lastly, a variation in the temperature of the mortar in which the amalgam was mixed. No definite data had been given as to the amount of mercury used, the temperature at which the original amalgam was softened, or the temperature of the mortar in which the mass was finally mixed up, and it might perhaps be found by further experiments that these things bore a definite ratio, and that the results would be more uniform when the methods themselves were more uniform.

Mr. S. J. HUTCHINSON asked whether Mr. Tomes had tried the effect of using gold to absorb superfluous mercury. In a former discussion, Mr. Walter Coffin stated that his father had been in the habit of using old gold to absorb mercury, and when he could not get old gold he used new gold. Had Mr. Tomes tried this plain, and with what result? He (Mr. Hutchinson) had used gold and burnished the fillings very carefully afterwards, but he was ashamed to say he had not used bits of ivory, or ink, either Draper's Dichroic or any other form, to verify his experiments. He had tried using gold, both waste and new, for the purpose of absorbing superfluous mercury, and their efforts in that practical direction would be considerably supported by any experience which Mr. Tomes could give them as to the use of gold for this purpose.

Mr. ROBBINS said he had faith to believe, notwithstanding all that had been said on both sides of the Atlantic, that amalgam was doing its work well if properly handled in the present day, in spite of the ink test. He would ask whether Mr. Tomes, in his experiments, used a good lining or a good pad of a mixture of oxy-phosphate and amalgam. In many cases that formed a splendid filling in fragile cavities, used alone, but it gave a better result when it was surfaced with

amalgam. The experiments, so far as he could understand them from the paper, went to show that large masses of amalgam would shrink, and must always shrink if put in as they were in the present day. In that case, would not it be better not only to have the lining, which was simply a lining, but almost three-quarters of the cavity, filled with an oxy-phosphate or the combination method? He was very interested in the question put by Mr. Hutchinson, because for the last three years he had used, and thought he got some good out of the use, a method which had been described of using heavy gold foil, in conjunction with pressure, over the surface of an amalgam to absorb the excess of mercury. He had tried tin and had become disgusted with that, because they could never tell what was left behind. Taking up this idea, he had experimented in the mouth and out of the mouth in a great number of cases for the last three years and in private practice. He never now put in a filling of amalgam without using this method, getting the last third of his cavity filled with the amalgam as dry as possible, building it a little in excess, burnishing it down hard, and then with a large, loosely rolled gold cylinder, held end on, exhausting all the surface mercury possible. Again he burnished and again used the Wolrab cylinder, the result, to his mind, being very satisfactory, with less failures. He would ask Mr. Tomes if he had used that method; and the globules of mercury spoken of as being visible under a magnifying power increased his boldness in asking that question.

Mr. PATERSON said that reference had not been made to the practice of lining cavities with osteo made of the consistency of cream and upon that plugging with amalgam at first rather moist, finishing off, drying, and taking great care that in the plugging of the amalgam upon this cream oxy-phosphate, the mixture oozing from the sides of the cavity was carefully removed and fresh amalgam carefully burnished into the edges, and seeing that the superfluous mercury and amalgam were wiped off at the edge. He had recently seen a bicuspid with a distal cavity that was filled with amalgam by that method four years ago, that was to say, the cavity was lined with creamy osteo, and the amalgam plugged in upon it, finished up in the way he had mentioned, and now at the end of four years, with the exception of a little roughness on the surface of the amalgam, which was easily made right, that stopping was uncommonly good. He

thought that no cavity should be filled with amalgam throughout; he believed in lining all cavities with osteo. The point with regard to the staining of the teeth was very interesting, because cavities lined in that way certainly did not stain. The only point on which one was a little doubtful was whether there was shrinkage of the amalgam round the edge, or whether the oxy-phosphate did not hold the amalgam and so obviate shrinkage. That was the point he had to find out, and if he could only get the tooth out to which he referred and which he had seen that day, and submit it to Draper's ink and test it, the result would be most interesting. The question of staining was very important, though as had been said, it was doubtful to what it was due. Mr. Tomes seemed inclined to believe that was due to moisture. In some cases, although leakage must have gone on, there had been no staining in some teeth, whereas in others where no eburnation had taken place great staining had occurred. That did seem to lend some weight to the idea suggested by Mr. Tomes. With regard to the use of old amalgam, he had often seen that suggestion carried out. He remembered an old practitioner who, in every tooth that he removed containing a black amalgam, used to break up the tooth and put up the amalgam into a bottle, and he invariably used the old stuff mixed sometimes with a little new. He believed in it as a much better filling, having less shrinkage. With regard to the standard amalgam, which he had used for the last five years, he had tried heating it, but had never been able to make anything out of it in the way of stopping. It was very difficult to bind up. He did not know how Mr. Tomes managed it, but the setting was extremely rapid, and unless it was mixed with some fresh amalgam and worked up in that way he did not know how it could be got into a tooth at all. Certainly it could not be worked on the plan of using osteo to start with.

Mr. ANDREW said that, in making a bar of amalgam out of the mouth, if the lower half was packed soft and the top with hard, dry amalgam, they got a warping in one direction. If it was done the reverse way, packing the lower half hard, and the upper half soft, they got a warping in the opposite direction, and that opposite direction was the direction the usually got in the mouth. The result was, if they had the soft amalgam below, the corners rose; if they had the dry above, the centre rose. It was the dry part above which the

had in the mouth, and then the centre would rise and draw away from the edges a little bit.

Mr. SCHELLING said some time ago he had the pleasure of seeing an amalgam filling which had been in a tooth for seventy-three years, and it appeared to have done so perfectly well that it would go on for some years more.

Mr. TCMES, in reply, said Mr. Lloyd-Williams had mentioned the difficulty of getting time enough to manipulate, even with a mix of new amalgam. If they used equal parts of new and old amalgam, the mix of the new must be very decidedly more plastic than one would ordinarily use in making an amalgam filling. Mr. Mansbridge asked if the amalgam was mixed in the hand. In nearly every instance he mixed his amalgams, when experimenting with new amalgams, by shaking them up in a tube, and then with a very brief rub in the palm of his hand. As to squeezing, in the majority of his experiments the original proportion of mercury added was not such that anything could be squeezed out, or very little, even if it were squeezed with the wash-leather and pliers. Where he was not using old amalgam re-heated he had the amalgam pretty dry to start with. In some of the experiments, particularly after finding the beads of mercury, or what looked like mercury, upon the surface of the setting amalgam, he did try mopping them with gold. He tried those which were mopped with gold both as to water-tightness and in regard to the beading, but although the beading might be temporarily got rid of it would re-appear in amalgams set in the ordinary way. He sometimes used heavy gold, but did not find it so good an absorbent as cylinder gold or several bits of thinner gold. It did not seem to amalgamate quite so readily. He took several fillings immediately after they were packed into the hole, lightly scraped the free surface, and the surfaces which had lain against the walls of the cavity. He then cut the filling in two and scraped something from the middle. He found on the rough analysis obtainable by igniting the two sets of scrapings in a porcelain crucible, that there was a very much larger proportion of mercury in the scrapings which came from the surface than in those which came from the interior of the mass, the masses being packed by the Bonwill method. There was a large difference. He tried the same experiment, waiting until the plug had set, again scraping the surface and the interior with the idea of seeing whether the mercury was uniformly distri-

buted through the mass, but still found more mercury in the surface than in the interior, though the excess was not so great as before the filling had set. This very likely accounted for the warping referred to, which was probably due to the re-arrangement of the mercury in the interior of the mass. Mr. Coffin had propounded an exceedingly difficult question as to what happened on reheating and in the re-hardening of the amalgam. He did not know in the least. When he said it would decompose, he had in his mind the idea, which was a loose one, not based upon any very accurate knowledge, that when an amalgam was mixed they first of all got a solution of constituent metals in mercury, and that an alloy more or less perfect forms in solidifying. His notion would be that in the heating of those amalgams they might break up the chemical compound and again get a solution in free mercury as with other metals, but it was a thing which it would be very difficult to investigate. Mr. Hern asked whether any difference was noticed in the shapes of the cavities—the ratio of the surface to the depth. He did not mention that, because if Mr. Hern would experiment he would find he would have to look very long in order to establish any point with absolute uniformity. His (Mr. Tomes') experiments were made in holes of uniform depth and diameter, and he could state nothing as to the ratio of surface to the depth. Mr. Beadnell Gill asked whether in his latter experiments he mixed the amalgam with the hand. It was quite likely that the discrepancies found in his experiments were due to something of that kind. His habit, as a rule, in mixing old and new amalgam was to rub it up in a warm mortar, quickly transferring it to his hand, just giving it a very brief rub, and then packing it in. There was very little rubbing up in the hand on account of the shortness of time. Mr. Lloyd-Williams suggested as another reason for the discrepancy, that there might have been great variation in the quantity of mercury contained in the pieces of old amalgam. In some of his experiments he used pieces of old amalgam about which he did not know much, but in the majority he used pieces of amalgam of his own mixing, belonging to this series of experiments which, in a large number of instances, had weighed proportions, and if they had not, were pretty uniform. Mr. Paterson referred to lining cavities with osteo-plastics. He did not experiment in that direction, because they knew quite well that if a cavity was lined with an osteo-plastic it would be water-tight

as far as the osteo-plastic was concerned. He had stated in his paper that no very large fillings should be made, at all events not with new amalgam. If they were going to fill a cavity with osteo-plastic instead of merely lining it, it should be mostly filled with osteo-plastic, and the amalgam should be regarded merely as a protective agent to protect the plastic from chemical changes, and therefore the amalgam would be very much less in quantity than the osteo-plastic. In that way they could make water-tight fillings. The difficulty was to be sure that the osteo-plastic was quite protected. He did not think that the amalgam mentioned by Mr. Paterson would set quickly enough to give the best results with regard to the contracted edge. Amalgam, to be most advantageously used, should be set as soon as ever it could be packed in, and if they packed pretty hard, and burnished then and there, that burnish would remain. They would get as bright a burnish upon fillings put in in that way as they could by polishing and burnishing on another day. As to the amalgam that he used, it was principally Foster Flagg's standard amalgam, though he had used others.

The PRESIDENT said it only remained for him to offer the thanks of the Society to Mr. Tomes for his paper, and also to Mr. Mansbridge and Mr. Andrew for their casual communications.

Dental News.

THE DENTAL HOSPITAL OF LONDON STUDENTS' CLUB.

The Annual Dinner was held in the King's Hall of the Holborn Restaurant on the 5th inst, Mr. David Hepburn in the chair.

After the Royal Toasts had been duly received and honoured, The CHAIRMAN proposed "The Students' Club." Although that was not an occasion for long speeches, there were one or two things to be said about the Club for the benefit of the strangers present. The toast included the Hospital, the Students, and the Club, and although it might

possibly remind them of a sermon he would refer to these three headings. They heartily desired the commencement of the New Building; some 58,000 cases were relieved last year, and he thought the public should subscribe more liberally and imitate, for example, what the students had done in the matter. The Public could scarcely realize what a boon the Hospital was to that vast metropolis. Amongst the organisations of the Hospital were the Students' Society and the Students' Club. Formerly the Student joined the Club at the General Hospital and no greater sign of the prosperity of the School could have evidenced itself than the formation of their own Students' Club. Alluding to its history, much had been due to their Presidents. The first was Sir Edwin Saunders, a man who was deeply interested in all the affairs of his profession. Next came one who was a distinguished student in all ways, Mr. Hutchinson, and in his hands they knew that the club was safe. As a Vice-President they had Mr. Woodhouse Braine, and one other name must be mentioned, that of the present Treasurer, Mr. J. F. Colyer. With regard to the students, the Club was usual for social purposes and also because Dentistry demanded *mens sana in corpore sano*. The old days of mutton-chop whiskers and frock-coats had gone out and with them the practitioner who always seemed as if he were playing a part, and people were becoming accustomed to be treated by gentlemen who were none the worse for taking part in the different forms of healthy sport. Social clubs were to be found wherever men congregated, and the speaker had read an interesting account by Surgeon General Don of the men on H. M. Ship "The Duke of Wellington" when in the Baltic, getting up a game of cricket on the shore almost under the enemies' guns. He thought the influence of athletics upon the student could hardly be over-estimated.

Mr. W. F. FORSYTH, Jun., in responding, said the Athletic Club now held smoking concerts, and had a social evening. These added to the prosperity of the Club and a few weeks ago there was a dance and this promised to become a hardy annual. The original athletic club was now merged in the Students' Club. They had had ten cricket matches, one of the most enjoyable of which was between Past and Present Students of their own Hospital against a similar team from St. Mary's Hospital. This was played at Henley, where they were entertained by the Dean. The Tennis Club owe a

similar debt of thanks to Mr. R. H. Woodhouse, who invited them to Ealing to decide the final matches. It was due to Mr. Humphreys that a very successful swimming entertainment took place at St. George's Baths. The Westminster team only beat them by a few seconds. The success of the Club was in no small degree due to the support it received from the Staff.

Mr. HUMPHREYS, as one of the students, proposed the toast of "The Visitors."

Surgeon-General DON, in alluding to his former experience in both the Navy and the Army spoke of the importance of proper mastication. Now in the central recruiting station he saw a large number of young men under 25 years presenting themselves with bad dentures. He hoped that at some future time the Services would have the benefit of skilled assistance. If his hearers had the opportunities of looking into the same number of mouths in a year as he had, they would be able to do some good work.

Mr. MORTON SMALE in proposing "The Chairman," said that one of his functions was to keep people up to duty and to obey authority, not always a pleasant task. When he heard that he had to propose this toast it became a pleasure. To-night he regarded their Chairman as almost a hero, for he was sacrificing his feelings under circumstances which might well have kept him at home. But he seemed determined that no interference with their pleasure should result from his absence. His life had been one of self-sacrifice and self-abnegation, and he was always ready to do anything for the Dental Hospital. He (the speaker) had just read Prof. Drummond's book "The Ascent of Man," and one of the problems laid down, the struggle for the life of others, was typical of their Chairman. He had been very modest in his own claims as an athlete, but he had done many things well and had made them a very good Chairman.

The toast was drunk with musical honours.

The CHAIRMAN, in reply, said he felt deeply touched by the words of Mr. Smale. To receive such compliments from one who had devoted himself to the interests of the Profession was a thing worth living for. He thanked them sincerely for the honour they had done him.

The proceedings of the evening were enlivened by an excellent programme of Music, in which Messrs. James Brand,

Arthur Smith (*Cornet*) Cecil Barnard and Alf. Rogers took part. A ventriloquial entertainment by Mr. Sidney Gandy created much amusement in consequence of the topical and dental references put into the mouths of the puppets.

NATIONAL DENTAL HOSPITAL.

The members of the Students' Society held a most successful Smoking Concert at the Hospital on the 21st ult. The Chair was taken by Mr. C. W. Glassington, one of the Staff, and there was a large attendance to enjoy an excellent programme.

PROSECUTION UNDER THE DENTISTS' ACTS.

At the Southampton Police Court, on Feb. 27, Solomon Arbus, hairdresser, of Oxford Street, was charged under the Dentists Act of 1878 with using the name of dentist, he not being registered. Mr. Lamport, who appeared for the defence, said he had advised his client to plead guilty. He was not aware that he was acting illegally. He was assured that no complaint whatever had been made by any one he had attended as to what he had done, although there had been with regard to his charges. What he had done he was entitled to do in his own country, and did not know that any different law prevailed in this country. He had in his hand a Government certificate, showing that the defendant was entitled to attend, in a certain way, at the hospitals of his own country. He was sorry that, through ignorance, he had forgotten to be registered, and he would do all that was necessary to qualify himself. He asked the magistrates to deal with the case as a first offence.

The Chief Constable said that the defendant had also been summoned under the Medical Act, but that summons had been withdrawn. Mr. Killby (who appeared on behalf of the Police) said it was the defendant's practice to examine his customers' teeth, which he cleaned with spirits of salts, a very strong lotion, and then made an extortionate charge. It was necessary for the reputation of the town that this practice should be stopped. The Chairman asked if any witnesses were to be called, but this was thought unnecessary, as the defendant had pleaded guilty. He was fined £10, and £3 3s. costs.

APPOINTMENT.

Dr. John E. Grevers, of Amsterdam, has been appointed Privat Docent of the University. Dr. Grevers recently read a communication before the Odontological Society upon Enamel Defects, and he is a welcome visitor at Dental Congresses where his knowledge of English, French, and German stands him in good stead.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents]

PLASTER OF PARIS.

To the Editor of the "British Journal of Dental Science."

Dear Sir,—As a constant reader of your Journal, and one who has followed with considerable interest the *Dental Laboratory Notes* by Mr. H. Rose, will you permit me to make a few remarks on *Plaster of Paris Impressions*, the value of which material I feel Mr. Rose has very much under-rated. I would have liked Mr. Rose to have stated more fully his objections to taking an impression of the mouth, without pressing out of place the gum and soft tissues; but having failed in this, may I state that my experience is, that any soft tissues so pressed down will either raise the artificial denture in masticating, or the friction on the same will be so great that the plate has to be "eased," and then again, on the hard palate, which unevenly resists the pressure of the composition, the plate will be found to "rock," i.e., if a suction disk of sufficient size has not been inserted to take off the pressure on that particular part. I think it better to scrape the plaster impression a little on any hard spot before casting. I do not find my patients raise any more objection to plaster than to composition, in fact, I think they prefer the former, which is made more palatable, and sets more quickly by the addition of a little salt, and is certainly more hygienic than the latter, which is used over and over again. Neither do I use a thick layer of soap, but a thin solution of silica to paint the impression with. I think that for all edentulous mouths, and crown and bridge work plaster is indispensable, but for some partial plates, and especially cleft palates, composition is undoubtedly the best material to use.

In preparing the tray for plaster, I do not smear wax over it, but slightly warm it, and over the surface drop beads of wax, and at the distal edge of the tray put a beading of wax, so as to keep all the superfluous plaster in the front of the mouth, and the beads of wax will keep the plaster and tray together, and facilitate the removal of the tray from the plaster impression when treated; or sometimes I select a tray a size too large, and line it with composition, with which I take an impression; I then freely cut and scrape the composition, and make undercuts to retain the plaster, using as little as possible.

Thanking you in advance for the kind insertion of this letter,

I am, dear Sir,

Faithfully yours,

HERBERT F. HILL.

Dental Hospital Reports.

WORK DONE at the Victoria Dental Hospital of Manchester,
during the month of February, 1895.

Number of Patients attended	718
Number of Extractions	523
Number of Extractions under Anæsthetics	186
Gold Stoppings	39
Other Stoppings	80
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	211
Crowns	2
Irregularities	35
Total	1076

JAMES A. LEES, *House Dental Surgeon.*

To Correspondents.

Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.

2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
6. The Journal will be supplied direct from the office on PREPAYMENT of subscription as under:

Twelve Months (post free) - - 14s. od.

Post-office Orders to be made payable at the Langham Place Hotel Office to G. E. Skliros, 289 & 291, Regent Street, W. A single number sent on receipt of seven (penny) stamps.

British Journal of Dental Science.

No. 653. LONDON, APRIL 1, 1895. VOL. XXXVIII.

HINTS ON PHOTO-MICROGRAPHY.*

By J. HOWARD MUMMERY, M.R.C.S., L.D.S.

Mr. President and Gentlemen,—The communication which I bring before you this evening can perhaps hardly be called a paper, but may be better described as some practical hints on photographing with high powers of the microscope.

To those who are already proficient in the art I must apologise for what may seem to be too elementary in my remarks. There may, however, be some among our members who may be stimulated to take up this most useful and fascinating pursuit, and to these a short explanation of the difficulties met with, and the means of overcoming them, by one who has suffered, may be acceptable.

Photo-micrography, as it is not too euphoniously called, is a science (for such we may now term it) of quite recent development, but it has already been of immense value in many departments of scientific study. There can be no doubt of the educational value of the photo-micrograph, and no course of lectures is now considered complete that is not illustrated by lantern slides.

Photographs are of great value as a check upon observation ; they keep drawings within bounds, and do not admit

* Read before the Odontological Society of Great Britain.

of quite such a play of the imagination as was frequently seen before the days when the camera was called in to assist the microscope.

While, however, fully recognising the value of the photograph in demonstrating minute structures, I do not think it is able to entirely replace the coloured drawing, but as a check it is invaluable, and it is highly desirable that all papers on histological research should be illustrated by both photographs and drawings. This has been excellently done in a recent publication by Dr. Carl Röse and Dr. Gysi, of Zurich, illustrating the histology of the dental tissues, they having published the photograph and an illustrative lithograph side by side.

While the drawing represents the appearance of the tissue under examination as seen through the microscope in slightly different planes, the photograph only accurately represents one plane.

There is one point in this connection on which I would lay great stress, and that is that the photograph should not be touched up in any way, either upon the negative or the print. As soon as this is done a suspicion is thrown upon its accuracy, and its value as a check upon observation is completely done away with.

Many collateral branches of knowledge bear upon the subject we are discussing to-night.

The great and rapid advances in the science of bacteriology made during the last ten years have greatly stimulated photo-micrography, as the minute organisms with which this new science is concerned are represented by photography with an accuracy and clearness not otherwise obtainable.

Another important discovery, that of isochromatic or orthochromatic plates, has been an excellent aid to the photo-micrographer.

These plates give the correct colour relations of the object

in light and shade, and a moment's reflection will enable any one to see the great value of this in photographing stained preparations. For instance, while formerly a yellow, from its weak effect upon the photographic film, came out black, or nearly so, a properly prepared orthochromatic plate (with the addition of a coloured light screen) renders it light in the resulting print, *i.e.* in its proper shade relations to the other colours of the spectrum. Blue, again, which to the eye appears to be a dark colour, is rendered as white upon the ordinary photographic plate (blue containing a very large proportion of the chemical rays of the spectrum); a colour-corrected plate reproduces the blue parts of the objects as dark in the resulting print.

I cannot, however, do more than touch upon this question of orthochromatic plates, as it would occupy too much of our time.

Another very important factor concerned in the recent advances in the art is the introduction of the new lenses; first, the water and oil immersion lenses of Zeiss; both these improvements greatly increase the light admitted to the object. As I have described elsewhere, and perhaps may be permitted to repeat here, in the immersion lenses, instead of the object being viewed through a layer of air, a drop of fluid is placed upon the cover glass, and the lens is brought into contact with this drop, so that the rays passing through the object from the source of illumination, traverse the fluid before entering the lens. The optical effect of this arrangement is that rays which, following the laws of refraction, would have been diverted to such an extent in air as to pass outside the front lens of the objective, are made to pass into the lens and assist in the formation of the image.

While the rays which pass from the object into air form an angle of 120° , those traversing water form an angle of 82° , and when passing through cedar oil an angle of 69° . It

will thus be plainly seen what an advantage is gained by the employment of these substances ; we have a much increased illumination, more rays being collected into the lens, and an increased working distance ; that is, for the same magnifying power, the front lens of the objective is at a great distance from the cover glass.

But the greatest stride in microscopic optics dates from 1886, when the firm of Zeiss, of Jena, introduced the so-called apochromatic lenses. Before the introduction of these lenses, a sharp image in any optical system could only be obtained with one portion of the spectrum, the other portions giving images not absolutely clear, but all more or less blurred. The apochromatic lenses give an image almost equally sharp with all the colours of the spectrum. In the old achromatic objectives the colour correction was only made for one portion of the area of the lens, so that towards the margins, and also at the centre, it was imperfect, but in the apochromatic lenses the colour correction is made equal for all portions of the area of the lens. Again, whereas in the older objectives only two colours of the spectrum were brought to one point, in the apochromatic system these colours are brought to one point. A special kind of glass in combination with fluorspar is employed in these lenses.

The effect of these corrections is practically to abolish colour in the microscopic image ; we obtain an increased concentration of light and a greater range of magnifying power with the same objective, as very high eye-pieces can be used with them without detriment to the image.

Special eye-pieces are used with these lenses called compensating oculars, and their use is rendered necessary by the fact that all lenses of high aperture, owing to their hemispherical fronts, magnify the blue more than the red ; an eye-piece is accordingly used in which the opposite error is introduced, the red being magnified more than the blue, and

consequently with these eye-pieces the image is free from colour up to the margin of the field.

It will be obvious that for photographic purposes these lenses are invaluable, because, combining as they do the chemical and visual rays of the spectrum in one point, the focus of absolutely clear vision is also that of chemical sharpness, and the image, as focussed to the eye, will be exactly reproduced on the sensitive plate.

There are many excellent workers in this art, both in our own country and abroad ; among the most prominent of the pioneers in this field are Dr. R. L. Maddox, to whom we are indebted for the invaluable suggestion of gelatine as a base for the photographic film ; Dr. Woodward, in America, who produced beautiful results before the introduction of the new lenses ; Dr. Neuhauss, in Germany, whose photographs of flagellated organisms are well known ; and in our own country Mr. Andrew Pringle, whose beautiful work with high powers is familiar to us all ; his photographs of dental caries we have all admired upon this screen. The work in this department of our friend and former President, Mr. Charters White, is also well known to us, and his excellent photographs of dental and other tissues.

In taking photographs with low powers of the microscope, no great difficulty comes in provided the specimens chosen are suitable for the purpose, but the photography of objects such as bacteria, with high powers, is a matter requiring great patience and perseverance, and it is in obtaining good results with a magnifying power of 1000 and over that the utmost refinements of the art are called into play.

An expensive and elaborate apparatus is not necessary in order to obtain good results.

Dr. Neuhauss of Berlin, whose photographs of bacteria are justly celebrated, worked with an ordinary bellows camera which he had himself adapted to the purpose, and an erection

of boxes on which he placed the microscope, making the connections with cardboard adapters, and obtaining his illumination from an ordinary round-wicked Argand oil lamp. There is no doubt, however, that a special apparatus has many advantages ; such a one as I have here to-night, although not nearly so elaborate as many that are now made, enables one to do the work with a minimum of fatigue, and ensures rigidity, which is a very important point. The first desideratum is of course a very firm and solid base-board, not supported on legs attached to it, but on a very firm and solid table, and for high power work, wherever possible, on a cemented basement floor, for vibration is the great bugbear of the photographer.

The bellows should be capable of considerable extension, and blackened cardboard diaphragms inserted at intervals to cut off all reflected rays ; a small amount of reflection from the interior of the bellows or of the microscope tube will give rise to ghosts in the negative—an unpleasant kind of phantom which generally manages to blur the one important part of the negative. The photographer with the microscope will find there is a perversity in things inanimate, and a persistent tendency to thwart him which he could hardly have given them credit for. It is always the best negative that breaks itself—I will not say gets broken, for it seems to go out of its way to court destruction.

To prevent these ghostly reflections, a careful examination of the interior of the camera should be made every now and then, and the slightest reflecting surface should be touched with a dead black paint ; the best I know for this purpose is “flat black” sold by Messrs. Naylor, of James Street, Oxford Street, a paint which appears to be absolutely without lustre. The microscope tube should be lined with black velvet. Any microscope will serve our purpose that is rigid

in the horizontal position, and nose pieces should not be used to carry the lenses, but they should be screwed directly into the microscope body to ensure accurate centering.

A good substage condenser is a very important part of the apparatus, and the high angle achromatic Abbé condenser of Zeiss is one of the best to employ, as it transmits a very large cone of achromatic light. It should be furnished with an iris diaphragm. If an oil lamp is employed as the radiant, a bull's-eye or similar condenser should be placed immediately in front of the flame, so arranged as to convey parallel rays to the back of the substage condenser. I prefer a large flat wick lamp, with the edge of the flame towards the object, not having had much success with the round wick employed by Dr. Neuhauss.

A means of using the fine adjustment while focussing at a distance is of course requisite. In the apparatus here shown this is obtained by a brass rod covered at one part with india-rubber; this bears upon a friction wheel, and by means of a cord and pulleys, works the fine adjustment. There are, of course, many modifications of this focussing apparatus.

The portion of the apparatus on which the microscope and lamp are placed is pivoted so that it can be rotated and the adjustments made while the operator is in a sitting position, before it is returned to its place in front of the camera.

For use with the orthochromatic plates, coloured glass screens are required—yellow glass of different shades being the most generally useful; a colour called signal green is valuable in photographing certain shades of red.* Many prefer to use fluid light filters instead of glass. A solution of picric acid forms an excellent pale yellow filter, and

* If the glass is placed well behind the microscope it need not be worked glass, but if placed within or near the sub-stage, it must be optically worked; the two surfaces must be quite parallel.

different strengths of a solution of bichromate of potash are useful when darker tints are required.

If sunlight or the lime or electric lights are employed, Zetnow's light filter is most valuable. It consists of dry nitrate of copper, $2\frac{1}{2}$ ounces, dry chromic acid, 2 drachms, water, $4\frac{1}{2}$ ounces.

If the lime light is employed, of course the exposure time is very much shortened, but the eyes must be protected in focussing with dark spectacles or a deep coloured glass placed below the stage.

I think perhaps our purpose will now be better served if I describe the steps to be taken in making the adjustments and exposure for photographing an ordinary object—first, supposing we are using a low power such as an inch or half inch, and secondly, with a high power such as a one-twelfth oil immersion at such an extension as will give a magnifying power of 1,000 diameters.

It is not every good microscopic object that is suited for the purposes of photography. An object showing great differences of density in different parts is particularly unsuitable, as by the time the thicker parts of the specimen are sufficiently exposed the thinner parts are hopelessly over-exposed.

We will suppose, however, we have chosen a good thin and even section of dentine or enamel, unstained. The first thing to do is to sit down to the turn-table, and having placed the eye-piece in the tube of the microscope, accurately adjust the centre of the flame to the centre of the field of the lens, using the flat surface of the flame, then place the object on the stage and carefully choose the best part of it, seeing that the lighting is fairly even. Removing the eye-piece we return the turn-table to its place, allowing the tube of the microscope to pass within the brass flange on the camera without touching it. A focussing screen carrying a piece of white

cardboard is now placed in the camera—the little door at the side is opened, and again sitting down by the microscope, the projected image is focussed with the coarse adjustment on the cardboard. We now judge if the field on the paper is evenly lighted, and probably find it advisable to adjust the bull's-eye condenser near the flame so as to diffuse the light evenly over the object and its projected image.

This method of preliminary rough focussing saves a great deal of unnecessary fatigue in focussing through the screen at the back of the camera, but once having obtained the focus on the card, we close the side door and put a plate-glass screen in its place; a very little adjustment with the focussing rod and fine adjustment with a focussing lens will give the true focus of the object.

Removing the screen we substitute the filled dark slide, and after closing the shutter of the camera, pull out the slide and all is ready for exposure. Being sure that the apparatus is free from vibration we open the shutter and give the exposure—such an object as this with a good light would require perhaps from ten to fifteen seconds.

If, however, we wish to photograph a slide of bacteria and magnify it a thousand times, we shall have to take further precautions, and as such a preparation will have been stained with an aniline dye, colour difficulties will have to be met. To obtain a negative magnified to this extent, a one-twelfth oil immersion lens, preferably an apochromatic lens of high angle, should be used in combination with a special projection eye-piece, although of course, by greater extension of the camera, an eye-piece can be dispensed with.

Place the substage condenser in position and with a half-inch lens focus down upon the condenser until the little hole in the centre of the cap is exactly in the middle of the field of the lens, then carefully centre the aerial image of the *edge* of the flame which is projected by the lenses of the

condenser. Replace the half-inch by the one-twelfth and again see that condenser and flame are properly centred, as although it is much easier to make these adjustments with the lower power the optical centre of the immersion lens may not quite correspond with it. In photographing a coloured preparation such as this, almost the full aperture of the condenser should be used—that is, the iris diaphragm should be nearly open to its full extent.

Another point is that the angle of aperture of the condenser should be equal to that of the objective if we wish to take full advantage of the latter.

The condenser and light being now centred, place the object upon the stage and focus down upon it. This being a coloured object we shall have to employ a colour screen, and if the stain is methyl violet or gentian violet a pale yellow screen will suit it best. The turn-table is now adjusted, the paper screen placed in position and viewed through the door—a rough re-adjustment of the focus with the coarse adjustment will be found necessary, and it must be seen that the edges of the disc are quite sharp; if not, the screw collar on the eye-piece must be shifted and an increased and even illumination obtained by means of the bull's eye as before.

In focussing with the fine adjustment the glass screen may now be dispensed with and the focussing glass, which may be either a Ramsden eye-piece or a spectacle lens of 8-inch focus as recommended by Mr. Bousfield, used upon the aerial image in the camera. With a long extension of the camera, the rays which form the image being nearly parallel, there is a considerable range in which the focus is quite sharp, and consequently we can dispense with the glass screen. This is often very convenient, as one's eye is not disturbed by any markings upon the surface of the glass.

If using a short extension, however, the rays being more

divergent, the region of sharp focus is much more limited in extent, and it is necessary to use the glass screen in order to insure that the sharpest focus of the object shall be exactly in the plane of the sensitive plate. We now close the shutter, examine again to make sure the focus has not altered, and very carefully insert the loaded back—open the shutter and expose. In this instance the exposure would be about six minutes, but the time must, of course, depend very much upon the nature of the slide and the depth of tint of the coloured screen.

All who undertake high power work must expect much disappointment—many negatives turning out failures, and only now and then does one secure a negative whose qualities are thoroughly excellent in every respect.

Developing a plate taken with a high power requires considerable experience and judgment. I have tried a great many developers, as hydroquinone, eikonogen rodinal and metol, but, like many others, I find I get the best results with pyrogallie acid and soda and more control of the development, adding fresh soda by degrees as the image appears, and always using a small quantity of a 10 per cent. solution of bromide in the developer.

If the negative is found to be clear, but under-developed, as is very often the case, it being particularly difficult to judge the density of a photo-micrograph before clearing, it may be intensified, and I have obtained excellent results with the ordinary mercury and ammonia intensifier, being very careful to remove all traces of hyposulphite before placing in the sublimate solution and washing very thoroughly before applying the ammonia. If the negative is a little veiled, it is better not to try to intensify, but one can often procure a very satisfactory lantern slide from such a negative by a contact print with a weak light.

There are many excellent makes of lantern plates, those I

have used lately being the special Ilford and the Imperial plates, developing with hydroquinone, to which is added a few drops of bromide. To obtain a perfectly clear background, which greatly adds to the beauty of the slide, I pour on and off two or three [times, as recommended by Mr. Pringle, a solution of hydrochloric acid in water (about one part to eight) and then thoroughly wash.

For printing I prefer any of the gelatinochloride papers, as they give excellent detail, glazing the surface by squeezing on to highly polished ferrotype plates.

If I have not already trespassed too long upon the time and patience of the meeting, I should like, in conclusion, to show a few slides illustrating what is meant by a good and bad negative, and showing some examples of easy and difficult objects.

THE DENTISTS' REGISTER FOR 1895.—According to the table on page 23, there are now 4,874 names upon the Register of United Kingdom Dentists. Besides these, in a separate Schedule, are 27 "Foreign Dentists," all of them with diplomas from either Harvard or Michigan. The percentage of Licentiates has now risen to 27·82 as against 26·48, 25·43 24·07 of the three previous years. No doubt it is somewhat difficult to keep the Register absolutely accurate, and we find more than one name upon the present list which we had marked off from that of 1893, according to information reaching us through the usual channels. According to the returns of Receipts and Expenditure in connection with the Dental Register Fund, which have to be presented to Parliament, the amount now due to the General Council stands at £447. In 1892 it was as low as £94, the next year rose to £538, and in 1894 fell again to £342.

DENTAL MECHANICS.
DENTAL LABORATORY.

By HARRY ROSE, L.D.S. Eng.,
Lecturer on Dental Mechanics, National Dental College.

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Continued from page 259.

IMPRESSIONS OF EDENTULOUS MOUTHS.

In all cases the tray should be introduced into the mouth one side at a time, the cheeks at the angle of the mouth then drawn back and the other side inserted. The handle of the tray should be exactly in a line with the nose, before pressing it up or down in its place. In some small mouths it is convenient to draw the cheek back by a piece of thick note paper folded once or twice, or by a retractor ; this will allow of the tray slipping past the angle of the mouth ; it acts very much after the principle of a shoe-horn, and also prevents any abrasion of the cheeks.

This operation should be performed with calmness and deliberation, for not only is it essential for our work, but it also makes the patient feel that he is in skilful and competent hands.

In taking impressions of the lower jaw, the same care must be observed as with the upper, in drawing the cheeks out of the way, and when the tray is in position, a folded napkin in the left hand should be held under the chin, to support it, until the tray is removed from the mouth.

On no account should the patient close the teeth or gums on the tray to press it into place ; should such inadvertently happen, the best thing is to resoften the composition and try once more.

By drawing in the breath deeply the patient takes the soft palate and uvula out of contact with the composition, should any exude from the back of the tray, and it enables him to tolerate the material in the mouth without retching.

If the mouth is rinsed out with cold water just before the impression tray is introduced the composition will harden the more rapidly.

In the case of a good impression of an edentulous upper, considerable force is required to remove it from the mouth, in fact by downward pressure on the handle of the impression tray, it would be difficult to effect its removal without hurting the patient, so it is usually found necessary to tilt it from one side to allow air to enter ; by so doing one is able to withdraw it more easily.

Should this method prove unsuccessful it is as well to ask the patient to go through the action of swallowing, while at the same time one draws down the handle of the tray, this seldom fails to bring the tray away.

Now, it seems likely that if the impression adheres so firmly to the roof of the mouth, the case if fitted accurately to the model, should do so likewise, and such we find to be the case.

If, on the contrary, the tray containing the composition comes away quite easily, one must carefully examine the impression, and if at all uncertain as to its correctness, it is as well to take the precaution of obtaining a second one, and at the same time warn the patient against moving during the process.

Should the impression still come away readily, one must inform him that the case may require springs ; at any rate his mind should be prepared for such an eventuality.

When taking impressions of the lower jaw, it will be found that the tongue has a great tendency to try and eject the tray

from the mouth, and great care must be observed that the tray is in the centre of the ridge, and not thrust forwards.

It is essential that we get a good deep impression of the mylo-hyoid ridges, as it is the amount of plate tolerated over these ridges that increases the stability of a lower set.

It is more necessary even than in the upper for the cheeks to be drawn away from the tray, for unless such is done a portion of the cheek in the vicinity of the attachments of the Buccinator muscles may be pressed down or folded over and thus not allow the tray to go fairly home.

This pressing down of the cheek may also take place by having too wide an impression tray.

IMPRESSIONS IN PARTIAL CASES.

In order to obtain an impression of a mouth in which natural front teeth are present, and also to avoid the necessity of using a large quantity of composition, a suitable tray having a recess in it for their accommodation must be used

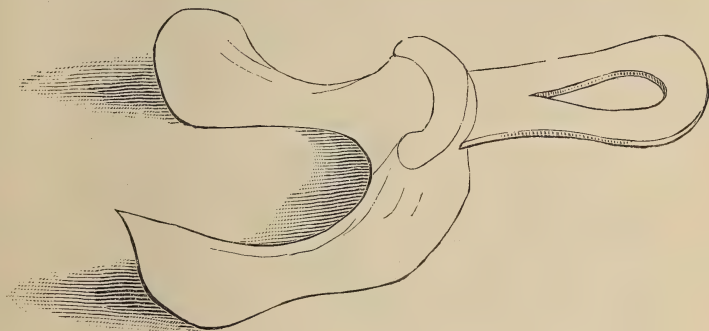


Fig. 25.

(Fig. 25) or else the tray should be so perforated as to allow the points of the teeth to pass through (Fig. 26). By either of these means a small amount of composition only is necessary, and the impression is obtained with greater certainty and more rapidity.

If a perforated tray is selected for use it will be necessary to press some composition over the points of the teeth when they project through the tray after it has been pressed into its place, and to effect this neatly a small German silver cap, (such as is shown in Fig. 27) may be used for this purpose. This cap should have some composition placed in it, and be handy for adjustment when required.

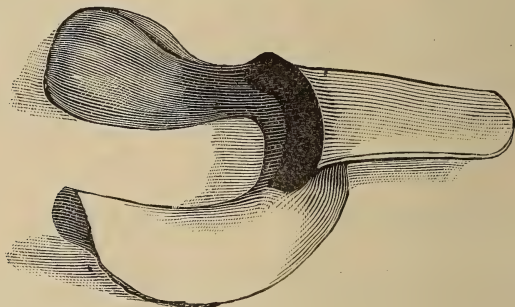


Fig. 26.

When there are very loose teeth in the mouth, which we cannot get permission to remove, care must be taken not to allow the composition to set too hard, or one of them might perchance come away in the cast. When the teeth are long

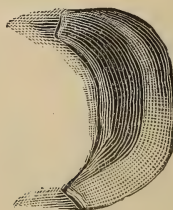


Fig. 27.

and straggling, or there are cavities existing, it is desirable to fill them with wax or moistened wool to prevent the entrance of the composition, otherwise they would form so many retaining points, and render more difficult the removal of the impression from the mouth.

But the better way, where undercuts are presented, is to fill them up with composition in the following manner.

Let us take as an example, a lower jaw from which the first molars and second bicuspid have been removed. The second molars are tilted forwards and the first bicuspid leaning backwards; thus we shall have a space presenting such an undercut, that an impression could not be taken without considerable dragging.

Now, to take a satisfactory impression of such a case, so as to insure the gum being perfect, we must first of all soften a little composition, and having previously rubbed a little vaseline over the fingers, mould the composition accurately to the undercut space or spaces in the mouth; when hard this should be removed and trimmed up, so that it presents a wedge-shape, tapering to the points of the teeth. The pieces are then rubbed with vaseline and replaced in the mouth, after which the impression is taken in the ordinary manner.

When hard, the impression is withdrawn, leaving the composition cores still in the mouth; these are next removed, and inserted in their respective places in the impression, into which they should fit with the greatest accuracy.

They are then fixed with a small quantity of hard wax, and plaster is poured into the impression.

By operating in this manner, or in a modification of it to suit certain cases, most accurate results may be obtained.

Now, although it is no use making our work to fit such an undercut, as we could not possibly get it into the mouth, still it is very desirable that we get a perfect impression of the gum in such a space. This we could not well do, if the impression dragged around the second molar tooth.

When there are long, straggling, or loose teeth, this plan answers admirably, as by moulding composition to the back of these teeth, trimming it up, and then moulding some more around the fronts, the two halves can be placed *in situ*,

and the impression taken. Thus we can obtain a most perfect cast without exerting any force upon the tender teeth in the mouth.

This plan of taking impressions admits of any number of modifications, and is dependant for its success upon first having a material free from elasticity, secondly, on the lubricating of the fingers with vaseline while working the composition, thirdly, upon using as small an amount of composition as possible, and fourthly, upon the forming of suitable supports for the composition during the process of hardening. These supports are made of strips of German silver bent so as to approximate to the shape of the part of the arch for which they are intended.

CASTING THE PLASTER MODEL.

After having obtained an impression of the mouth by either of the methods set forth, the cavities in the impression represented by the natural teeth, should now have thin pieces of iron wire placed in them ; this is done by just warming the end and pressing it slightly into the composition at the points of the teeth. The pieces of wire should be about three quarters of an inch long ; the object of using them is of course to strengthen the plaster teeth.

The impression should then be dipped into cold water, and shaken, to remove any surplus moisture; this will allow the plaster to run more freely into every part of the impression.

To obtain a model or cast of the mouth, plaster of Paris is mixed with water until it is free from bubbles, and is about the consistence of thick cream. It is then introduced a little at a time into one end of the impression, and carefully made to enter each cavity at the side, flowing into it without choking, and being shaken until it runs right round to the other side by this means the air is forced out of the cavities and replaced by plaster.

The imprisonment of air in any part of the impression will be shown, in the resulting plaster cast, by what is termed a "blow," and the presence of such flaws in certain parts of a model very often renders it useless for correct working.

When mixing plaster, some dentists put the water into the basin first and then let the plaster trickle into it. This is a very good way ; it does not require so much mixing, and there is less likelihood of portions of unmixed plaster being present, but it is a rather more wasteful method than that of putting the portion of plaster into the basin first, and then adding water to it, and incorporating it with a spoon, spatula or broad-bladed knife.

In this latter case the plaster can be mixed thicker if necessary, in order to expedite its setting ; it also increases the hardness of the model.

One must carefully avoid getting portions of unmixed plaster into the impression, by means of thorough incorporation prior to pouring, and by seeing that it is free from lumps.

The cavities formed in the model by the presence of unmixed plaster have an irregular crumbly appearance, whilst a "blow," due to imprisoned air, is smooth and sharply defined. By both these methods of mixing plaster, equally good results can be obtained by the careful workman. After the impression has been filled, a portion of plaster about equal to the size of the model required, is placed upon a sheet of lead or zinc, and is worked up to approximate somewhat to the size of the impression, when it has set sufficiently to bear the weight of the impression; this latter should be turned over and pressed on to it, and the plaster moulded up round the sides. It is then left to harden.

If in casting a model for an edentulous upper or lower the shape of the impression admits of it, we can oil the surface of the impression and thus obtain several casts of it,

the oil allowing the plaster model to part from the composition without destroying it.

But in the ordinary case, the cast when hard is placed in hot water for a few seconds : this heats the tray and permits of its removal from the composition. The cast and composition are then replaced in the hot water until the composition is so soft that it may be removed from the model, which is afterwards trimmed up with a sharp strong knife to a suitable shape. If the model is required for a gold or other metal plate, it has to be cast much thicker than if the case is for vulcanite, in order that the zinc casts to be hereafter described may be produced sufficiently thick to resist the blows of the hammer in striking or swaging up the plate. Thus for vulcanite, a model need not be more than one inch in depth, whilst two inches would be about the thickness required for a model for plate-work. Before pouring plaster into a plaster impression it is necessary to apply to the surface of the impression a solution of soap, or if the plaster impression is quite dry, a coating of shellac varnish, and after the varnish has become quite hard it is covered with a little oil. The object of this is to ensure a parting between the model and the impression when the former is hard. After the model has been trimmed up it is put in a warm place to dry slowly, if intended for a plate, and when all moisture has been driven off it should be either varnished, or boiled out in stearine or in a mixture of two parts beeswax to one part resin. This hardens the plaster and renders the surface of it less likely to be rubbed in the subsequent operations upon it. For vulcanite work it is unnecessary to specially dry the model except for regulation cases, &c.

(To be continued.)

NITROUS OXIDE.*

By Mr. J. J. BREAKELL.

Let me begin with a short history of the gas, N_2O . Nitrous Oxide, Nitrogen Monoxide, Protoxide of Nitrogen or Laughing Gas, was discovered by Priestley in the year 1776. At first it was simply a curiosity. We do not find its anæsthetic properties made use of until 1799, when Mr. Davy, of Bristol, afterwards Sir Humphrey Davy, re-examined it, and though he was not brave enough to undergo any surgical operation while under its influence, he tells us, in one of his works, that "he inhaled the gas freely to assuage the pain consequent on cutting a wisdom tooth." I think he would find that wisdom tooth a rather expensive luxury before it was fully erupted. The gas was simply inhaled through a tube held in the mouth, and a quantity of air was thus necessarily breathed along with it. This mixture of air and gas caused much excitement and hilarity upon its being inhaled, and hence the term "laughing gas," which name it is surprising to find is still far from uncommon.

Nitrous Oxide was first used in dentistry proper in 1842, by Mr. Horace Wells, a dentist of Hartford, Connecticut, but in consequence of one or two failures, its first rush of success was not maintained, and very little was heard of it till 1868. In that year Dr. Evans, an American practising dentistry in Paris, came over to England with another American (Dr. Colton's) apparatus; he gave demonstrations at the Dental Hospital, London, on March 31st, 1868, and a Committee was appointed by the Odontological Society of Great Britain to investigate the subject; this Committee's report being favourable, the permanent success of Nitrous Oxide Gas was assured, and nothing remained but to make improvements on the rude apparatus of Dr. Colton; these

*Read before the Student's Society, Victoria Dental Hospital, Manchester.

have been made, and at the present time Nitrous Oxide is considered the safest and best anæsthetic for short operations, and is certainly the anæsthetic *par excellence* for us dentists.

The gas when pure is colourless, with a slightly sweetish taste and smell, and is half as heavy again as air. But we do not always get pure gas, and it is well that we should know something about the impurities generally met with and the methods of detecting them.

Nitric oxide is, I think, the most commonly met with, and is due to the distillation of the ammonium nitrate, from which the gas is made, having been carried on at too high a temperature. The presence of this nitric oxide can readily be detected by the irritating smell and nauseating taste. The Gas may also contain chlorine from the presence of ammonium hydrochlorate in the ammonium nitrate; this can be detected by passing a little of the suspected gas through a solution of silver nitrate, a precipitate indicating the presence of a chloride. And again, the gas when pure has no effect on red or blue litmus paper.

Nitrous Oxide can be bought from various makers in 50 and 100 gallon bottles, but some dentists still prefer to make their own. The one great advantage of home-made gas is that you are not cumbered with a lumbering apparatus in your surgery, the only things visible being the face-piece and the tube running to the gasometers in the workroom. This is a decided advantage when you have to administer and extract for yourself.

We will now give a few moments' consideration to the manufacture of Nitrous Oxide. It is made from Nitrate of Ammonium, the equation being $\text{NH}_4 \text{NO}_3 = 2 \text{H}_2\text{O} + \text{N}_2\text{O}$. A glass retort to hold about 7 lbs. of Nitrate, four wash bottles, and a gas holder are required. If the gas holders are of fifty gallon capacity each, seven pounds of nitrate will make sufficient gas to fill four, that is 200 gallons. The wash

bottles should be of a fairly large size, and fitted with a rubber bung in which two holes have been punched large enough to allow glass tubes to be put through. The glass tubes are bent at right angles, and small pieces of india rubber tubing connect the ends of the tube together, and thus connect the bottles together, and with the retort.

The first wash-bottle is simply to catch the water formed in the process, and so the incoming tube need only enter the bottle a little way. The second bottle at the commencement of the process should be about one-third full of fresh water. The incoming tube should be so long that it dips well into the water, whilst the outgoing tube protrudes about an inch and a half beneath the bung. The third bottle is about one-third full of a solution of sulphate of iron, 4 ozs. to the pint; the tubes are arranged as in No. 2 bottle. The fourth bottle is about one-third full of liquor potassæ B.P., the tubes being arranged as in 2 and 3. Having filled your retort and having connected your bottles together, but leaving the exit tube from No. 4 bottle free, you can now put your light under. This must be of the smallest, and be raised gradually as the retort gets warmer. I always put the light under late in the afternoon, raise it slightly towards evening, and then leave it for the night. The light must be raised slowly, as the ammonia melts and gas begins to bubble through the bottles. When you think that all the air has been driven out of the bottles, and when the gas coming from the exit tube of bottle 4 will rekindle a glowing match you may connect the No. 4 exit tube with the tube leading to the gasometers, and the process is begun.

Now, the one great thing to be guarded against is overheating. If the ammonia be overheated gas is driven through the bottles at too great a speed to be thoroughly purified and again, the danger of your retort smashing is greatly increased. Ammonium Nitrate has a peculiar property. On the temper-

ature being raised above a certain point, although the light be withdrawn from under the retort, the ammonia still continues to generate heat, and once this process of generation has begun it is very difficult to put a stop to. If you think your gas is coming off too fast turn down the light, if this has not the desired effect turn out the light. But if after your light is turned out, heat is still generated, get out of the way, and with a pair of bellows blow on the retort, or fan it with a newspaper or piece of cardboard. This is sometimes effective but at others the ammonia gets hotter and boils up to the neck of the retort, the glass smashes, and the melted ammonia is showered round ; keep out of the way if you can, for its burning propensities are something terrible ; I speak from experience. But all generally goes well, and in about two hours either your gasometers are all full or the ammonia is all distilled ; you then turn out the light and after the gas has ceased to bubble through, disconnect the bottles at the junction of the second and first. Remember to separate the bottles or the vacuum in the retort sucks back the water of the second bottle into the first, and, from the first, into the retort, which of course is smashed. Your gas is now ready for the patient.

The other method, which is far more common, I believe, is to buy the gas. For this method you require an apparatus consisting of Gas Stand, Bottles, Gas Bag, and Face-piece with fittings, but as this method is in use at the hospital, I will not go into details, but proceed at once to the administration.

First, with regard as to the preparation of the patient ; unlike chloroform and ether, the patient need undergo no special course of training. With regard to diet ; it is not advisable to administer directly after a good and hearty meal, in case a tendency to sickness be induced. Gloves, eye-glasses or spectacles should be removed ; artificial teeth should on no account be allowed to remain in the mouth, and all tight-

fitting clothing, such as collars, scarves, and tight waistcoats in the male, and tight neck-bands and corsets in the female should be loosened. Now apply a towel over patient's chest to prevent any blood getting on the clothes, and make a careful examination of the teeth to be extracted. Now fix your mouth-prop or gag. Of these gags there are many forms and varieties, from the simple home-made vulcanite one to that gigantic conglomeration of springs and gutta-percha we see sometimes. Every operator has his particular fancy, and experience soon enables us to pick out the most suitable gag for each case.

Having fixed your prop on sound teeth, no time should be lost in applying the face-piece. Care must be taken that this fits the face for it is most essential that no air should be admitted. The most common "weak spots" as we might call them are in men, the beard and moustache and in women the sides of the nose and angles of the mouth; if a patient has a heavy moustache twist the ends of it inwards towards the mouth; if a beard is the cause of trouble apply the lower part of the face piece just under the lower lip, and the beard should be well damped in the vicinity. When you are satisfied that your face-piece fits accurately turn on your gas.

Now, what are the indications of complete anæsthesia, and when should we remove the face-piece and commence to operate? There are several symptoms which are generally looked for, stertorous breathing, jactitations, and loss of conjunctival reflex. Now all these symptoms may be present, and yet the patient be able to stand a few more breaths, and on the contrary all these symptoms being absent, still the patient may be fully anæsthetised, and to such a condition that if the gas be pushed still further dangerous symptoms might present themselves.

The loss of the conjunctival reflex is of very great value—when present, but to make a rule of pushing the gas until the

symptom is developed in every case, is to expose your patient to considerable risk. Mr. Constant in his work "How to Give Gas," says, "It cannot therefore be too strongly enforced that if gas is pushed in all cases till the loss of the conjunctival power becomes evident, in not a few artificial respiration would have to be resorted to, even if matters did not proceed as far as a coroner's inquest."

But there is also a danger of giving too little gas, which is an error more easily perpetrated than that of overdosing. One might say "Well, in the event of not giving sufficient gas, one is on the safe side." But is this so? Think of the shock caused by extracting a tooth when there is just sufficient consciousness to feel and to magnify the pain, and not sufficient to understand the why and the wherefore of such pain, for we must remember that one effect of the gas is to exaggerate the special senses just before unconsciousness takes place. The ordinary symptoms of gas are as follows: The skin of the face becomes livid, the lips bluish, the eyes fixed. Continuing the administration we notice the breathing becoming slower, and hear the stertor becoming more marked, the eyeballs oscillate, the eyelids twitch, and the pulse becomes appreciably slower. If the operation is expected to be a short one, a sufficient degree of anæsthesia has now been produced. But if the operation is likely to be a long one, and we wish to prolong the period of anæsthesia as much as possible, we may push the gas still further with increased care. The respiration will now become truly stertorous, and show a tendency to intermit, convulsive twitching of legs and arms being very apparent, and shortly a condition of tonic spasm sets in. The pupil is now widely dilated, and in most cases the conjunctiva on touch is found to be incapable of the reflex action. The time taken in inhalation is generally about 60 to 70 seconds, and the amount of gas used anything

from 3 to 6 gallons. The patient returns to consciousness in from 25 to 35 seconds.

This is supposing that all goes right, as it generally does, but we must also look on the unfavourable side for a few moments.

Though the number of deaths whilst under gas, (whether due strictly to the agent or not) is still well under the baker's dozen,* we cannot tell when and where the next case will turn up. In cases where death has occurred it has been found to be due either to syncope or asphyxia.

Syncope. This we may look for in the anæmic, the weak and debilitated and those suffering from heart disease. It is seldom we get real heart failure indicated suddenly during nitrous oxide anaesthesia, but we often see the common ordinary faint which if not speedily treated may pass into true syncope. The symptoms of fainting are, or ought to be very well known—the pale face, the muscular relaxation, the cold clammy perspiration, the dilation of the pupils, the fluttering pulse and almost complete cessation of respiration all point to the simple faint. The first symptoms probably will be the sudden change in the breathing which from the ordinary noisy respiration of gas, suddenly appears to cease altogether, or at all events to become shallow. But this is by no means an uncommon occurrence, and provided that the pulse is all right, and the breathing becomes normal after five or six seconds, there is no cause for alarm. The cessation of respiration for longer than six seconds as a rule yields readily to pressure on the chest wall, but if this fails more severe treatment must be adopted. Place the patient in such a position that the head is lower than the rest of the body, unfasten any tight clothing, open the mouth and pull forward the tongue, now hold a broken capsule of nitrite of amyl, or

* The number has increased since Mr. Breakell's paper was written.—Ed.

a little strong ammonia to the nostrils of the patient. This is generally sufficient, but if signs of recovery are still wanting, we must have recourse to artificial respiration. Sylvester's method is undoubtedly the best, and should be kept up at the rate of fifteen or sixteen times a minute for at least an hour before all hope is abandoned.

Asphyxia. Asphyxia occurring during the extraction of teeth is almost invariably due to some mechanical obstruction, as a mouth-prop or a stray tooth. The symptoms are, increased lividity of the face and neck, gasping and struggling for breath, which soon terminate in the cessation of all attempts at respiration, and shortly after is followed by stoppage of the heart's action. The treatment of course is to be immediate if it is to be of any use. If we are sure that the trouble is due only to blood and mucus congregating in the larynx, and not to any hard body, pull forward the tongue, hold the patient's head forward so as to allow the collected blood to flow out of the mouth, and then with a sponge attached to a holder, wipe out the pharynx as thoroughly as possible.

If, on the other hand, the trouble is arising from a hard body impacted in the larynx, clear out the mouth as before, and with a pair of throat forceps search for the obstruction. If this fails, laryngotomy and tracheotomy are recommended but as these operations are, as yet, new to me, I will not attempt any remarks on them.

This concludes all I have to say, and I heartily thank you all for the attention with which you have listened to my paper.

It is supposed that the use of handkerchiefs first became general during the Empire in France. The Empress Josephine had bad teeth, and to hide the deformity when talking or laughing always held her handkerchief before her mouth.

THE ART OF CASTING AND WORKING SHEET METAL.

By THOMAS FLETCHER, Grappenhall, Warrington.

I have had the pleasure of making a representative collection for the London Dental School, of specimens of casting in iron, brass, bronze, tin alloys, and type metal ; showing the various methods of coring undercuts, two to five part moulding, casting in metal moulds, and hammered work from the flat, with graver and punch work. Some of the examples are unique, and have been taken from my own private collection, much to the annoyance of the "powers that be" at home, who object to its being reduced. Those members of the British Dental Association who were at the meeting in Warrington, will no doubt remember seeing this, and it has been suggested that a similar collection would be valuable in every Dental educational centre.

I shall be pleased to supply a similar set, with the full description of the methods by which the results are obtained, to any English or Foreign Dental Schools, which are prepared to provide a suitable case for their exhibition and examination. The case for the London set was made by Messrs. Garnett & Sons, of Warrington, who fully understand this class of work, but, of course, as regards Schools abroad, it will be cheaper to obtain these on the spot. To those who wish for this collection it must be remembered that it is a work of time, suitable examples are not to be obtained at a day's notice, and the London collection required over four months to complete, not allowing for my own specimens, which could only be obtained by accident. To those who can see the London collection, I may call special attention to

one minute casting in iron, by Devaranne of Berlin, showing the method of casting the finest filagree work. Like Michael Angelo, Devaranne is dead, and has not left his "business" to any one, his work is unique and "uncommercial": so far as I am aware they are not to be purchased at any price, except when odd examples come into the market by accident.

SPECIALISM IN MEDICINE.

Mr. FRANK H. CARPENTER, in the course of a letter in *Guy's Hospital Gazette* writes as follows :

I have always been of opinion that in view of the brevity of human life, specialization was essential to a high standard of excellence in any department of work, and, speaking on behalf of my own profession, I will quote two of many cases that have strengthened my opinion.

CASE I.—A soldier in a military hospital suffered intense agony for days, caused by the diseased root of a bicuspid tooth. *Treatment*.—Poulticed on the *outside* of the face (almost the size of a small balloon), and sent out after a pleasant variety of said poultice and pain, with the offending member *in situ* and the pleasant prospect of a future happy time.

CASE II.—Patient, a man. *Diagnosis*.—Diphtheria. *Treatment*.—Patient isolated. House turned inside out by sanitary authorities. *Result*.—Great expense and inconvenience, with no relief to sufferer. Fortunately, a "superficial specialist" in my own profession discovered that the tissues and adjacent inflammation were due to an impacted lower wisdom tooth, on the removal of which the patient speedily recovered.

British Journal of Dental Science.

LONDON, APRIL 1st, 1895.

NERVES IN DENTINE.

Perhaps there is no more exciting topic in the field of Dental Histology than that raised by the question whether nerve filaments can be traced into dentine. The sensitiveness of a tooth deprived of its enamel, seems to demand at first sight some such explanation, but the presence of Tomes' fibrils and the inability to see any nerves have led us to regard the processes of the odontoblasts, or possibly some other cells, as being charged with conveying sensory stimuli to the pulp. A few years ago, however, considerable interest was occasioned by what is known as "the DENTZ specimen," taken, if we remember rightly, from a temporary tooth. Towards the periphery of the dentine are to be seen some bodies resembling the nerve terminations found elsewhere in the body. About the same time it was our duty to chronicle a communication of MICHAEL MORGERNSTEIN, of Baden-Baden, in which it was claimed by the author that he had unmistakably demonstrated the presence of nerve elements in the hard tooth tissues. No details of the necessary manipulations were then to hand, and we were obliged to content ourselves by waiting for further promised communications.

The *Deutsche Monatsschrift für Zahnheilkunde* now contains another contribution by the same author, in which he says that, in consequence of the great importance of the subject, he refrained from publishing anything more until he had found a successful method by which any practitioner could demonstrate with certainty and for himself, the nerves in dentine without great difficulty. The present communication, therefore, gives a condensed account of the proceedings necessary for such an operation. It is recommended that the experiments should, at first, not be made upon

human teeth, but that incisors of such animals as the calf are better, inasmuch as they are easy to use in a fresh condition, and the size of the histological elements is advantageous. Alluding to his former statements, the author reminds us that there are certain places where the nerves are especially to be looked for, namely, the areas between the cornua of the pulp and the masticating surface. Nerve-trunks, almost cylindrical in form, run out from the pulp into the dentine. In the incisors, the nerves run in a layer in the axis of the crown, parallel with the labial surface, towards the edge of the tooth, and thus a crescent-shaped plate is seen on transverse section, subdivided into two or three portions corresponding to the original developing columns of the incisor.

On transverse section the cylindrical nerve bundles and the nerve plate are differentiated from the surrounding tissue, the former appearing whitish grey and opaque, whilst the latter is lighter and transparent.

Freshly extracted teeth are hardened in the usual manner. Alcohol, 1 per cent. Osmic Acid, $3\frac{1}{2}$ per cent. solution of sublimate give good results, and we are warned that the hardening must be carried out with the necessary caution and without undue haste. At least four weeks are necessary. The author has obtained good results by using 1 per cent. Osmic Acid for three days, and after changing the solution, continuing the process for about six days. After thorough washing in running water for twenty-four hours the material was subsequently hardened in absolute alcohol for from one to three months. After dividing the tooth with a fine saw, the pieces are laid in carbolic zylol for twelve hours and then in Canada balsam (made soft by warming) for at least twenty-four hours at a temperature between 50° and 60° Cent. If the pulp is sufficiently impregnated with balsam the surface of the tooth can be washed with zylol and the crown prepared for grinding down. For longitudinal sections a diamond disc on the dental engine may be used. Then comes staining in a concentrated, filtered solution of Fuchsin, the sections being immersed for about half an hour at

a temperature of 60 C. After washing in water, dehydration for two minutes in absolute alcohol, and clearing in oil of cloves for twelve hours, the upper surface of the preparation is ground down under water on a fine corundum stone, until the deep red portion is reached. This surface, finely polished, is mounted on a holder with Canada balsam, and the other side reduced until the section is about 0.2 m. m. thick. After removal it is again stained, washed and dried and examined in oil of cloves. The author draws attention to the many-ganglionated fine nerve plexus which surrounds the nerve plate proper, and describes numerous primitive fibres and axis cylinders running out, mostly at right angles, in the dentine to the labial and lingual surfaces.

The matter is, in our opinion, still open to much criticism and we have thought it well to place before our readers the process recommended, in the hope that some may be tempted to test it. It will be noticed that a modification of the Weil process is employed, and that the general staining is postponed until after the impregnation of the pulp with Canada balsam. Are the appearances noted really due to the presence of nerves, and if so, do the latter accompany the fibril which is undoubtedly present in the dentinal tubule? To trace such minute structures in unbroken continuity from the pulp into the dentine is no easy task even if they exist.

COMPRESSED GAS IN CYLINDERS.—The recent catastrophe at Fenchurch Street Station recalls a previous case (to which we drew attention at the time), and no doubt appeals to many Dentists who are in the habit of using compressed Nitrous Oxide. In the first case it was found that the fault lay in the cylinder, but if the witnesses in the last instance were not mistaken in their belief that the accident was accompanied by a flame, it would point in the direction of a true explosion rather than that the cylinder burst through its weak structure. It has been suggested that the metal undergoes some molecular change, and the manufacturers

therefore take the precaution of re-annealing the bottles from time to time. There is also the question as to how far they are strained when being subjected to the very stringent test before they are first filled with gas. The cylinder destroyed the other day was certified to have been tested up to 3500 pounds to the square inch, whilst the Oxygen gas inside was only under a pressure of 1800 pounds.

PROSECUTION UNDER THE DENTISTS' ACT.—What is stated as being the first case of its kind in Ireland was decided at the South Dublin Police Court on the 19th ult. Mr. Louis Levey, of 132, Stephen's Green, was summoned for using the title of "Dentist," whereas his name did not appear in either the Medical or the Dentists' Register. It was contended that the Defendant was entitled to be registered, as he was in practice before the passing of the Act, and that he had been in partnership with a Registered Dentist. Some who may be able to say the same will be interested to find that these pleas did not avail, for the Magistrate, inclined to be lenient, said that as it might be difficult to find out cases of this kind, he could not, in the interests of the public, impose a smaller penalty than £5, with costs £2 2s.

NEURODIN IN NEURALGIA.—This analgesic, which was introduced two or three years ago, is reported upon by LIPPI, in *Il Policlinico*. It may be given in doses from half to three grammes several times a day, and produces no marked physiological effects. It is not so certain in its action as some other similar drugs, such as phenacetin and antipyrin, but it has been found to soothe and even remove neuralgic pains. It, however, has the disadvantage of not being easily soluble.

PHOSPHORUS POISONING.—It seems that white phosphorus is still used in the French match factories, and M. MAGITOR now describes a form of chronic poisoning amongst the workers. A peculiar cachexia with a slight yellow tinge of the skin is to be found in all the factory people. The breath has a smell of garlic, and anæmia with defective

metabolism and nutrition are other effects. Amongst certain changes which occur in the bones, the well-known necrosis of the lower jaw is also produced. The treatment recommended is a milk diet, turpentine internally, and the employment of ozone ; it must be kept up for a considerable period.

ARGON.—The newly discovered constituent of the atmosphere has been occupying the attention of some of the continental critics, and M. BERTHELOT has found that it combines with benzine in much the same way that Nitrogen does. Under these circumstances he calls in question the choice of the name given to the gas. Prof. RAMSAY, in an after dinner speech the other day, whilst modestly referring to his share of the discovery, said he obtained about a couple of wine-glassfuls of argon, but at present it did not seem to be of much practical or physiological use in either the vegetable or animal kingdoms. Peas representing the former and three mice (combusted) representing the latter, had been used as an experiment, but there was no trace of the presence of argon in either.

COCAINE.—The price of cocaine, as evidenced by the wholesale transactions in this drug, has been steadily rising for the last ten months, and according to recent advices it will continue to do so for some time. The state of affairs in Peru, and especially in the district where the crude cocaine is manufactured, seems to partially account for its present price which is higher than at any time since April, 1892.

A NEW ILLUMINANT.—Acetylene appears to promise well. At a meeting in New York of the Society of Chemical Industry, Mr. T. L. WILLSON last month read a paper upon Calcium Carbide, for the production of which he has patented a process. A mixture of coal and lime subjected to the intense heat of an electric furnace, results in the formation of Calcium Carbide, and the acetylene from this, it is confidently expected, will yield an ordinary illuminating gas which can be sold at 5 c. per 1000 cubic feet.

Reviews.

Helps in Sickness and to Health. By Henry C. Burdett.
London : The Scientific Press, Limited, 1894. Price 5/-.

This book is otherwise described as a guide to Home Nursing, and a Handbook to Health in the Habitation, the Nursery, the Schoolroom, and the Person. It certainly contains a large amount of useful information presented in a common-sense manner. We have naturally turned to those pages where questions connected with the Teeth are discussed. At the end of the chapter on the Care of the Person, we find remarks upon the use of tooth powders and brushes to which no exception can be taken. The author apparently does not care to trouble his readers with the bacteriological explanation of Caries, but adopts the chemical cause by decalcification. He also accuses tartar as a chief cause, but whilst this may be a factor in the premature loss of the teeth, it can scarcely produce caries. We are glad to find that when dealing with the nursing of patients, the author pays attention to a matter too frequently neglected. "The teeth and mouth require especial care if the patient is unable to attend to them himself, or dark-coloured foul discharges gather round the teeth and gums. The nurse should in these cases dip a rag in Sanitas and water, or lemon juice and water, and carefully cleanse the teeth and gums with it. afterwards burning the rag. In some fever cases this must be done very frequently. A small piece of stick or whalebone with the rag tied to it is preferred by some."

Turning Lathes: A Manual for Technical Schools and Apprentices. Edited by James Lukin, B.A. Fourth Edition. Britannia Company, Colchester, 1894.

This is a useful book for the Dental Pupil to read, the most instructive parts perhaps being Chapter I containing a Description of the Lathe, and Chapter IV on Metal-Turning with Hand Tools. There are many illustrations, and the fact that several of them illustrate the products of the Britannia Company and that there is a priced catalogue bound up at the end does not detract from the utility of the work.

Aide-Memoire du Chirurgien-Dentiste. By M. Paul Dubois.
2nd Edition. Paris, 1894.

This is a text-book for the French Dental Student and Practitioner. M. Dubois has done his work well, and has had the advantage of the collaboration of the late Dr. Thomas, Dr. Isch-Wall and M. Paquy for the more strictly surgical parts of the book. It is published under the patronage of the Paris Dental School, and in the preparation for the State Diploma which is so actively going on the *Aide-Memoire* will doubtless be in great request.

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary monthly meeting, February 4, 1895. Mr. Frederick Canton, M.R.C.S., L.R.C.P., L.S.A., L.D.S., President, in the chair.

The Minutes of the last meeting were read and confirmed.

The following were ballotted for and elected non-resident members of the Society:—Ernest H. A. Mackley, L.D.S. Eng., 74, St. Giles Street, Norwich; Thomas Llewellyn Nash, L.D.S. Edin., 39, Church Street, Inverness; William Simms, L.D.S.I., 2, Bury New Road, Manchester.

The following were proposed as resident members of the Society:—Francis Mark Farmer, L.D.S. Eng., 17, Great Marlborough Street, W.; Harry Symes Prideaux, L.D.S. Eng., 41, Wimpole Street, W.; Frederick James Frankland Rooke, L.D.S. Eng., 42, Kensington Gardens Square, W.

The following were proposed as non-resident members of the Society:—J. Main Nicol, L.R.C.P. Lond., M.R.C.S. Eng. L.D.S. Eng., 2, Clarendon Road, Leeds; George Arthur Peake, M.R.C.S. Eng., L.R.C.P. Lond., L.D.S. Eng., Alma House, Cheltenham; Frank C. Porter, L.R.C.P. Lond., M.R.C.S. Eng., L.D.S. Eng., 12, Oxford Street, Nottingham; George Nash Skipp, L.D.S. Eng., Sale, Cheshire.

The LIBRARIAN reported that he had received, in addition to the several journals, periodicals and exchanges, *The Medical Magazine* for January, 1895.

The CURATOR said he had received a model containing a

supernumerary tooth, conical in shape, and occupying the position of the left upper incisor. Neither the situation nor shape were very uncommon, but it was an interesting specimen nevertheless. It was taken from a boy, aged 8, and was presented by Mr. W. H. Pidgeon, one of the students at the Hospital. A lower lateral incisor taken from a boy, aged 14, had been presented by Mr. W. Rispin, one of the house surgeons of the hospital. The crown had been fractured transversely, killing the nerve, and the pulp cavity was very largely opened. Food getting in, the boy was in the habit of whittling a match down to a point to pick it out with. The result was that eventually he broke the match into the tooth. It worked further and further down the root canal, ultimately penetrating through the apex, and producing an alveolar abscess which lasted three months. At the end of that time the tooth was extracted at the Dental Hospital, and the piece of match about one-eighth of an inch in length was, when seen, projecting through the apical foramen. About a year ago a somewhat similar specimen was presented to the Society by Mr. W. A. Densham, a former student of the Dental Hospital. Unhappily, the piece of wood had been broken off before the specimen came into his (Mr. Bennett's) hands, but the remains could be seen in the root canal. In the present instance the piece was preserved intact and would be a valuable addition to the Society's collection. A very valuable specimen had been presented by a non-member of their profession, but a gentleman who took a great interest in the Society and its museum. He referred to Mr. R. J. Larking, of Melbourne, who had already sent a good many valuable donations. He (Mr. Storer Bennett) had mentioned to him that the museum possessed a female dugong skull, but not a male, and that the only specimens they had of the male dugong consisted of two tusks. It would be within the recollection of the members that the tusks of the female dugong were functionless, never being erupted, and unlike those of the male, they terminated in a large boss at the distal extremity, while the teeth of the male were hollow at the distal extremity, as were all other teeth of persistent growth. Mr. Larking had now sent a skull of the male dugong, with the tusks perfect, forming a very valuable addition to their collection, and one for which they were greatly indebted to him. Mr. Charters White had presented a model showing the apex of a canine erupting in the palate. It was taken from a lady aged 55. She had worn a plate for a long time with comfort, but eventually "a pimple" formed in the palate, and later on

the apex of the canine came through, In connection with this case he might mention an interesting one that occurred in the Dental Hospital only a few months since. A woman aged 23 came, requiring upper and lower plates. The wisdom teeth were unerupted. After wearing the plates for two or three months she came back saying they caused extreme pain at the back of the mouth, and on examination it was found that the four wisdom teeth were beginning to appear, no doubt due to the pressure caused by the plate. That, of course, was not absolutely identical with the present case, because, apparently in this instance, the plate had been worn for a much longer period. Mr. Charters White, with his usual indefatigable energy had made a section through the root and had also presented photo-micrographs of a transverse section about half way down the root, showing a very large amount of cementum, and a very small pulp canal. The Society was very much indebted to Mr. Charters White for his valuable contribution.

The PRESIDENT said the Council had nominated Mr. Stocken, a very old member and a vice-president, for election as an honorary member.

The resolution was carried by acclamation.

Mr. W. E. HARDING said in practice they met with a large number of cases of pulps decomposing with cavities in such a position that if the root canals were small and indistinct they could not be thoroughly cleared. The old method adopted in such cases was either extraction or rhizodontropy. Mr. Coleman, many years ago, suggested the use of arsenious acid applied to the pulp chamber. That treatment had a measure of success, but it had been almost entirely discontinued for various causes. He (Mr. Harding) had for a number of years, used a 10 per cent. solution of bi-chloride of mercury in absolute alcohol. A piece of cotton wool or other fibre was soaked in the solution and placed in the pulp chamber. The absolute alcohol was made to evaporate with the hot air syringe and the cavity closed. In other cases where one could get a little way up the canal he worked a little of the strong solution into the canal itself, drying as before. This was exceedingly successful. At the Dental Congress at Chicago in 1893, Professor Miller read a paper on this subject, in which he advocated the use of a pellet formed of bi-chloride of mercury combined with thymol, one-tenth of a grain of each were sufficient. He (Mr. Harding) found the one-tenth was really more than was required, and that pellets

containing one-fifteenth grain of each were sufficient. He had treated about 200 cases in this way, and had very few returns. Some had had further trouble, abscess and so on, but by far the larger number had been very successful. He did not advocate this treatment for any cases in which the canal could be got up, for he was an exceedingly strong advocate for filling all root canals where it was possible, but there were a large number of cases in which, from the position of the tooth, and the shape or size of the canal, it was almost impossible to get up, and for such cases he found this treatment very valuable. Of course the time, about eighteen months, was hardly long enough to give a good test. He had an upper molar in his own mouth in which the palatine canal was filled with gutta-percha, but the other two roots were so small and tortuous, that his colleague, who was filling the canals, could not get up, and consequently he put half of one of those pellets over the mouth of the two buccal roots. The tooth was filled with amalgam and had been perfectly comfortable for about eighteen months. Bi-chloride of mercury stained the tooth and therefore should not be used anywhere near the front of the mouth. Indeed, it was a mode of treatment never wanted for the incisors or canines, but was only necessary for molars and teeth in an awkward position.

Mr. BETTS said he had recently been rather disillusioned with regard to the solution of bichloride of mercury in alcohol. An eminent chemist had informed him that after heating for a short time, the bichloride became a monochloride. Therefore, when one spoke of putting bi-chloride up the root of a tooth in alcohol solution it was not exactly so. The bi-chloride became a mono-chloride and there was a chloride of ethyl formed.

Mr. GARTLEY presented a molar tooth with very twisted roots, exhibiting in a practical way the difficulties of root filling.

Dr. J. E. GREVERS, of Amsterdam, gave the following communication on "Hypoplastic Teeth," his remarks being illustrated by a series of lantern slides:—

I have to commence by asking your indulgence for the unsatisfactory state of the few slides I have to show. The art of photography I have just commenced to learn, and the photographs which will be shown to you this evening are the first that I ever made.

In 1881, when the Seventh International Medical Congress was held in this city, a paper was read in the section

diseases of children, by Dr. Magitot. The title was "Erosion," and Magitot defended in this paper the theory that erosion of the teeth was due to eclampsia infantum exclusively.

Congenital defects of the enamel, or, as the French and German writers call it "erosion," was first mentioned by Fauchard. Bunon gave us, however, a full description of its microscopical appearances and of its etiology. Microscopically it has been investigated by Wedl, and in his standard work, "The Pathology of the Teeth," some very valuable points are brought forward. But the description given by Wedl was far from being complete, and a further investigation was desirable.

O. Tsigmondy, of Vienna, has recently published the results of investigations which have added materially to our knowledge. These results are identical with mine, which I verified by a personal visit and inspection of his microscopic slides, a few of which I will presently show you.

One word more as to the names under which this pathological condition is known and described. Various names have been given—Erosio, odontopathie atrophique, rachitic, scrofulous, mercurial, syphilitic, honeycombed and atrophic teeth are the best known. I need not dwell here at any length on the impropriety of most, if not all, of these names. Erosio and atrophia are the most frequently met with, but both are insufficient. Erosio, derived from erodere, means a gnawing away, and erosi dentes means, with the old writers, caries or hollow tooth. It is true that teeth so affected have the appearance of having been gnawed away, and clinically we could agree with the name, but pathologically we must reject it. Atrophic teeth, as I understand these teeth are called in England, cannot satisfy us either.

Ziegler in his work on "Pathological Anatomy," vol. i., p. 116, defines atrophy as follows:—"Under pathological conditions retrogressive metamorphoses frequently appear which are analogous to the physiological metamorphoses leading to conditions that are denoted as atrophia, and appearing to the investigator as a diminution of the organs or disappearance of single tissue elements."

A few lines previously we read:—"Retrogressive metamorphosis in general is characterised anatomically by a diminution of an organ; microscopically by a diminution and final disappearance of the constituent elements, namely, of those that are specific to the organ in question."

In an earlier edition of the above mentioned work (1887)

Ziegler expresses himself as follows :—" In the last (atrophia), we have not so much to do with an original defective formation as with a retrogressive metamorphosis of normally laid out and formed parts."

Now it is clear, gentlemen, that to the congenital defects of the enamel now under consideration we cannot apply the word atrophia. It cannot be said that we have here to do with a normally formed tissue, although it may safely be presumed that the enamel organ was normally laid out.

In section 37, page 113, seventh edition of the same book, we find words which may with more propriety be applied to the enamel defects. Ziegler says here : "If entire parts of the body or systems of organs, or a single organ, or parts of this organ have through external or internal causes been checked in their development, and therefore defectively formed, and abnormally small and defective, we call this hypoplasia ; if some parts fail entirely, aplasia or agenesis."

It will be clear to you, gentlemen, that I do not adopt the definition of Lancereaux as given in his "Treatise on Pathological Anatomy," vol. i. Hypoplasia he defines as an alteration which has its starting point in a lowering of the nutrition of the tissues, and has as its characteristic an infiltration of the histological tissues by substances that trouble and impede their functions. At first I had adopted the word aplasia, and called the congenital defective teeth, aplastic teeth. Later I changed this word to hypoplastic teeth, and found myself supported by Tsigmondy and Cunningham, who in 1893 proposed to adopt this last word.

As the forms under which hypoplasia may make its appearance in the teeth are various, I have adopted the following names :—(1) hypoplasia cupuliformis ; (2) hypoplasia cuspidiformis ; (3) hypoplasia sulciformis ; (4) hypoplasia semilunaris or Hutchinsonian teeth.

Microscopically the three forms first mentioned show a distinct line running from the outer surface of the enamel to the periphery of the dentine, forming with the latter an angle of 30 to 35 degrees. In general the course is identical with or parallel to the striæ of Retzius, and they behave under transmitted light, and with incident light thrown by a bull's eye condenser in the same manner as the striæ of Retzius—that is to say, they appear by transmitted light brown, and by incident light white.

You all know that according to the researches of v. Ebner

of Vienna, these appearances are due to spaces between the enamel prisms, which contain air.

We therefore must look upon the line as being an exaggerated space, not between, but in the body of the prisms, a condition which finds its origin in the checking of the calcification of the prisms. This checking of calcification may be of a very short duration, and then show itself as a hypoplasia cupuliformis or sulciformis, or of a long duration and then may be diffuse, or take in one-third or one-fourth of the entire length of the crown of an incisor.

Mr. F. J. BENNETT said with regard to the specimens just exhibited, and for which the Society must be very grateful, if he had followed the point of Dr. Grevers' remarks, it was that in these defective teeth the irregularities followed the line of development or growth. Dr. Grevers appeared to claim an originality in his explanation of this, but he (Mr. Bennett) would point out that they found in "Salter's Surgery" a full description and drawing of this process, showing that Salter had arrived at the same conclusion many years ago. He called them the "incremental lines," and he not only described them in the dentine but also in the enamel, showing most distinctly what Dr. Grevers had pointed out, that the irregularities followed strictly the line in which the formation and development of the tooth took place. He would commend Salter's work to Dr. Grevers' notice, because they must claim an English origin for this idea.

Mr. CUNNINGHAM protested against the statement made by Mr. Bennett, and would undertake to say that neither Dr. Grevers nor Dr. Tsigmondy would have put forward before a scientific society, as original, something that had already been written by Salter. He believed that those gentlemen were equally acquainted with Mr. Bennett with the incremental lines of Salter, and he defied anyone to show from Salter what had been shown on the screen that evening. It was quite true that those pathological lines did coincide with the so-called incremental lines of Salter, just as they also coincided with the lines of Retzius, but they could understand and differentiate between them. The work brought before them by Dr. Grevers was, he would say, advisedly a work of augmentation, and work that had never been shown before the Society previously.

Mr. BALDWIN said the Society was very much obliged to Dr. Grevers for introducing this classification, which he took to be certainly original. Did he understand Dr. Grevers to

apply the term erosion to the particular development? Here it had always been usual to restrict the term, not to congenital defects, but to defects acquired in perfectly well formed teeth—defects of a peculiar character simulating a fine file cut, generally at the neck of the tooth, but also appearing at other points upon the tooth surface in which loss of substance could not be explained by the ordinary effects of friction but were very obscure as to their cause.

Mr. MUMMERY thought they were rather confusing the lines of incremental growth, as shown in Salter's book, with the lines of defective development. The lines shown by Dr. Grevers were not lines of ordinary incremental growth; they were lines of arrested development and reformation.

Mr. F. J. BENNETT explained that what he intended to say was that the defects strictly follow or revert to the lines in which growth takes place. There was an arrest of growth and the irregularity followed nothing but the line which growth would take.

Mr. MANSBRIDGE asked how the slides were mounted. They were really very beautiful specimens, being so very transparent.

Dr. GREVERS said, in reply to Mr. Bennett, what he would have said had been exactly expressed by Mr. Cunningham and Mr. Mummery. Salter's book was not unknown to him, and if Mr. Bennett referred to it he would find a picture of the development, but he would not find the lines he (Dr. Grevers) had shown in his specimens. The incremental lines were well known to him, but he had not gone very deeply into details in his paper, owing to the shortness of time at his disposal. In reply to Mr. Mansbridge, he said the preparations were mounted in Canada balsam. He hoped at some future time to bring forward a further communication on this subject.

The PRESIDENT said he was sure the members would be very happy to give Dr. Grevers an evening for the purpose.

Mr. J. HOWARD MUMMERY then read a paper "Hints on Photo-micrography," which is published on page 289.

DISCUSSION.

The PRESIDENT said he had seen at the Royal Institution an exhibition of an apparatus similar to the one now described, but with one very charming addition, There was a tube at the side which reflected the image. The object was that

for instantaneous work on any specimen of a moving description they could watch the instant with the bulb in their hand when the image was in the middle of the screen. No doubt Mr. Mummery had seen the apparatus.

Mr. CHARTERS WHITE said he should be very presumptuous indeed if he attempted to improve upon the paper Mr. Mummery had placed before them. It was so very lucid and full of truth that when published in the *Transactions* he would recommend every colleague of his to take it up and study it. He could endorse a good many of the statements from his own practical experience, with regard to the amount of light necessary to cut off with the iris diaphragm and on many other points. A great mistake was made in the practice of photo-micrography in having the details of the object so flooded with light that nothing could be seen but a glare. If the light was softened the details would gradually come out and they could get the photograph. He strongly agreed with Mr. Mummery as to the use of iso-chromatic plates and also as to the staining of the screen. A pale yellow screen—picric acid—was very useful to get contrasts. He had not been so successful with signal green, which appeared to lengthen the exposure without giving any great benefit. The microscope supplied to him some years ago had a revolving diaphragm of several shades of blue, which he found very useful. Beyond that he had seldom used more than the pale yellow or signal green. The scientific value of the coloured screen was yet in its infancy. Several gentlemen were working at it and were giving the results from time to time to the Royal Microscopical Society. No doubt they would in time find a screen that would answer their purpose in every way better than those they were now using. He was very pleased with the exhibition of Mr. Mummery's slides on the screen. He (Mr. White) had never worked anything up to a thousand diameters; it was beyond his power with Pickford's van and things of that kind rushing past his house over a granite crossing just in front of his door. The difficulties of photo-micrography were not overcome even by bundles of the *British Medical Journal* placed under each end of his stand. He envied those men who had a concrete floor and could live out in the country and do this sort of work. If they could only have an uninhabited island to themselves, photo-micrographers would be in a perfect paradise.

Dr. PARE asked Mr. Mummery how he used the screen, and also if he could say something as to the length of exposure of iso-chromatic plates. At present, being only an infant in arms in this subject, his great difficulty had been with the iso-chromatic plates and the yellow screen. He had used the yellow screen several times but as yet he had got nothing. He had got something now and again with other plates, but the colour did not come out quite right.

Mr. ROUGHTON said, speaking from one's own experience, the practice of photo-micrography was rather an expensive matter. They might begin with a very simple apparatus consisting of a box, into which they poked the end of the microscope, thinking they were going to do wonders. Gradually they found that would not do, they must get something better. They accordingly made another apparatus, perhaps buying another microscope. Then they thought ordinary lenses would not do and apochromatic lenses were suggested. By that time there was not much left of £100. He advised any gentlemen going into photo-micrography to make up their minds at first to do it properly, and to see if they could afford to expend a great deal of money on it, for if not they had better leave it alone. For his part he thought the value of apochromatic lenses was slightly over-estimated. He had taken a good many photographs of a certain object with an achromatic twelfth, and also with an apochromatic twelfth, and the difference between the two was not very great. He thought most of the work could be done as well with an ordinary achromatic lens as with the very much more expensive apochromatic lens. With regard to illumination, he always used the lime light, the exposure required being much shorter than with the oil lamp. It was very much more easy to manage in every way. The only difficulty was, of course, a little extra apparatus with the lime light. In photographing objects such as bacteria, at all events with the red or violet screen, he invariably used the Zettnow solution. What was wanted was that the image on the screen at the end of the camera should be practically black, and by the time the rays of light had passed through the Zettnow solution and reached the sensitive plate there were not many of them left. He wished to endorse the remarks made by Mr. Charters White as to cutting down the light with the condenser. The more faintly stained the object, and *a fortiori* if they came to unstained objects, the less illumination was required. The condenser wanted to be cut down so that they could only just see the image on the

screen. By cutting it down very much and giving longer exposure, much better results were obtained than by shorter exposure with a bright light.

Mr. W. HERN asked whether Mr. Mummery had been able to get coloured photo-micrographs. At the Harveian Society last year he had seen some very lovely specimens of coloured photographs, fruits and flowers appearing perfectly natural. It struck him whether using similar methods for photo-micrography the actual staining could be brought out.

Mr. BEADNELL GILL wished to thank Mr. Mummery for his valuable paper and also to endorse his remarks with regard to development. He did not think they quite understood the very great improvements that might be made by a more careful study of development. He would ask whether Mr. Mummery had found any particular advantage in his work from first immersing the plate a reasonable time in pyro before using the accelerator or the developer. From his own small experience he found that in many cases he had a great deal more control over the development by first getting the plate fairly well saturated with pyro. The photographs shown were particularly free from all appearance of air bubbles, and it would be interesting to know how the development was conducted.

Dr. GREVERS asked whether Mr. Mummery had tried oiled ground glass as a screen. He (Dr. Grevers) was only a tyro in this business, but he thought it had been of some help, by enabling him to bring out the image very clearly on the ground glass instead of using the cardboard.

Mr. MUMMERY, in reply to the President, said he had heard from Mr. Pringle that he had just completed an instantaneous apparatus, and no doubt it would be very useful. It was, of course, useless for high powers, but for low power work and moving organisms it would be very valuable. With reference to closing the aperture of the iris diaphragm, he thought Mr. Charters White had somewhat misunderstood him. He was rather an advocate for a very full aperture; at all events with deeply stained or at all well stained preparations he got much better results with the full aperture than with the diaphragm much closed. If the preparation was unstained the aperture was closed to some extent, but not more than one could possibly help. He often closed it for focussing, opening it before taking the photograph. No doubt the signal green required a prolonged exposure, but when the exposure was sufficient the result was good. No

doubt in taking these photographs everyone had suffered much from vibration, but a very good plan is to stand ready with a card, and if a cart is heard coming in the distance, just to put the card in and it could be taken out without the least vibration to the apparatus. Mr. Roughton spoke of the expense to which one was put in taking up photo-micrography. No doubt that was a general experience. Improvements kept on being made, but still, one stopped short after a certain time. There was a beautiful apparatus devised by Mr. Pringle, and used at the Veterinary College, which was most elaborate. The operator could sit down at one end and move the whole adjustments. It had supports and pillars to prevent vibration, but he did not know but what quite as good work could be done without all this expensive apparatus, providing one had a firm table and a cement floor. Mr. Roughton also spoke of the use of the apochromatic lens. He (Mr. Mummery) agreed that as good results could generally be got with the ordinary achromatic lens as with the apochromatic; but the test came with difficult objects when they wanted to get plenty of light, and then the apochromatic lens was the best. He often, himself, used the lime light, but had, on this occasion, exhibited lamp light as being the most simple. Very good results could be got with the lamp. All Dr. Neuhauss' fine specimens of flagellated organisms were taken by the lamp, and nothing better was produced by the lime light. It was not his practice to have a very much closed condenser. In reply to Mr. Beadnell Gill, he did not think much was gained in developing by immersing the plate in the pyro first. He was very careful in adding the accelerator, putting very little at first, and then, as the image gradually came out, adding more. By that means he could get as good a result as by putting it first in the pyro and afterwards in the accelerator. He had never used the ground glass screen. He had used a porcelain screen instead of paper, but it was not so good. There was a certain amount of translucence in the porcelain, and cardboard gave better results. It was only for rough focussing, because directly the fine adjustment is commenced the paper screen is removed.

The PRESIDENT formally thanked Mr. Mummery for his paper and Dr. Grevers and Mr. Harding for their communications.

British Journal of Dental Science.

No. 654. LONDON, APRIL 15, 1895. VOL. XXXVIII.

ON TUMOURS OF THE JAWS.*

By J. BLAND SUTTON, F.R.C.S.

Tumours of the jaws has for me a deep and abiding interest and I selected this subject for my communication to the Society, because it enabled me to demonstrate from a review of our present knowledge, imperfect though it still is, the great strides that have been made during the last quarter of a century in our knowledge of tumours in general. A study, of tumours of the jaws illustrates in a marked manner the great advantage which has accrued to Pathology, and therefore to Scientific Surgery from Virchow's generalisation, that every formation to which the term tumour (used in its modern restricted meaning) can be applied, is composed of tissues which have a prototype in the body. By means of this law, (which is indeed the foundation of the methods of classification of tumours now in use, and likely to be employed for many years to come), it is possible from knowing the structure of an organ to predict with absolute certainty that particular genera of tumours would occur in it primarily, and others would not. Virchow, in his great work on Tumour Diseases only dealt with cysts and the connective tissue group of tumours. The latter he isolated from those

* An Address delivered before the National Dental Hospital Students' Society.

tumour-like diseases which he called infective granulomata, *e.g.* tubercle, the gummatous lesions of syphilis, etc. The great pathologist did not deal with the important group of Epithelial tumours, which include adenomata and carcinomata. I have devoted a great deal of my life since entering the profession, in determining whether the same principle which Virchow maintained for the connective tissue tumours holds good for epithelial tumours, and in extending the investigation to animals so as to give it a broad zoological basis.

In investigating tumours of the jaws grave difficulties were encountered, but as the inquiry proceeded it became deeply interesting and furnished confirmatory evidence of a very important character. Before tumours were subjected to microscopic examination, it was the custom to speak of all tumours of bones as exostoses, and in the beginning of the century sarcomata and chondromata of bone were called exostoses as well as those osseous growths to which the term has been restricted in recent years. Gradually the tumours have been differentiated one from the other, and we know that every tissue entering into the formation of a bone, may be the distinguishing tissue of a primary tumour of a bone. Thus in the case of a femur from a lad of sixteen years, we get from the periosteum, sarcomata and lipomata ; from the bone, exostoses ; the white marrow is the source of round and spindle-celled sarcomata ; the red marrow yields myeloid tumours ; and the epiphysial line is the starting-point of chondromata ; but we never get an epithelial tumour primarily in the bone. Suppose a tumour found in a long bone furnished on microscopical examination epithelium, we at once study the disposition and character of the epithelium, and often we are able to decide with certainty the situation of the primary growth, whether it was in the rectum, the mamma, the thyroid gland, etc.

The frequency of tumours of the jaws is due to the number of structures mingled with the proper tissues of the jaws. Thus we have not merely to consider the tumours arising from the bone and periosteum of the mandible and maxilla, but in addition, those arising from the muco-periosteum covering the buccal surface of the mandible and maxilla, and lining the cavity of the antrum, and also those arising from the teeth. This will give such a table as the following :—

TUMOURS ARISING

From <i>Bone</i>	...	...	...	Osteomata	{	Round-celled
				Sarcomata		Spindle-celled
						Myeloid
From the <i>Gum</i>	...	...	...	Fibroma		
				Sarcomata	{	Round-celled
					{	Spindle-celled
				Warts		
				Epithelioma		
				Mucous Cysts		
From the Mucous Membrane						
of the <i>Antrum</i>	...	...	...	Myxoma (Polypus)		
				Sarcomata		
				Adenoma		
				Carcinoma		
				Epithelioma (boring)		
From the <i>Teeth</i>	...	...	...	Odontomata		

It is of course impossible to deal with these tumours in detail in a single paper, but I seize the occasion to point out the importance of distinguishing between the protuberant masses of bone formed in Leontiasis ossea from true osteomata, and to avoid confounding exostoses with hard odontomes. In a similar way fibrous odontomes should be carefully distinguished from myeloid tumours, the latter being as a matter of fact, somewhat rare tumours of the jaws.

DENTAL MECHANICS.
DENTAL LABORATORY.

By HARRY ROSE, L.D.S. Eng.,
Lecturer on Dental Mechanics, National Dental College.

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Continued from page 308.

After obtaining the plaster casts, our next care is to model pieces of composition to represent as near as possible the size, depth, and outlines of the future case or cases. These pieces must be sufficiently deep to give us the length of teeth in each jaw, also their inclination, thus enabling us to restore to

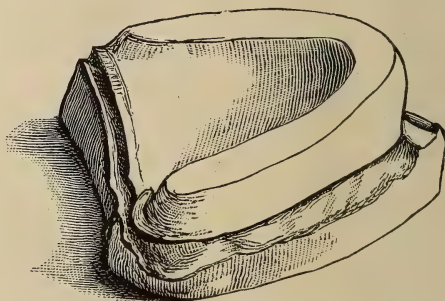


Fig. 28.

the features their lost expression, by causing the lips and cheeks to resume their former outlines. We must by these means get the slant of the teeth and the centre of the mouth, and lastly it must give us a correct idea of the perfectness of our model. In order to ensure this latter result, we must take some amount of care in the manipulation of these dummy pieces or bites, in making them fit the models, and be sufficiently strong and rigid to resist the pressure of biting

without becoming bent, as would be the case were we to use a material such as wax for instance.

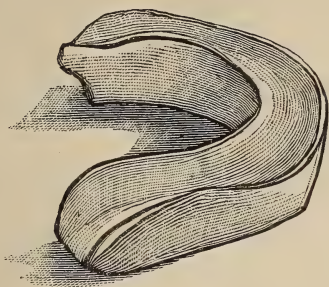


Fig. 29.

The way I recommend for making these pieces is the following:—

Take the plaster model and dust it with French chalk, then soften a piece of composition, and flatten it into a plate about $\frac{1}{8}$ of an inch thick and sufficient to represent the size of, or a little more than, the future case; dip it into the hot water again, to make quite soft and then carefully press it

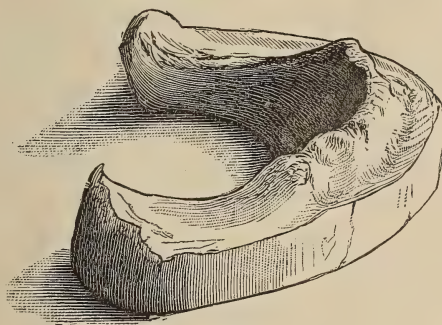


Fig. 30.

over the surface of model. Before it gets quite hard, mark the outline of the size with a sharp knife before removing it from the model. By doing this it is trimmed up much easier, the composition readily breaking away at the incisions, and

the subsequent finishing touches can be done with a moderately rough rasp. Now we must take a piece of strong iron wire, about twice the thickness of pivoting wire, and bend it into the shape of the alveolar ridge, after which it should be made hot in the flame of a spirit lamp, and sunk into the composition plate. In shallow bites this strengthener must be placed so that it does not interfere with the proper closure of the teeth. After this operation another piece of composition is softened and moulded into a roll sufficiently long to extend round the arch of the alveolus; this is to represent the size and length of the teeth, and it is made to adhere to the composition plate by warming the surface over a lamp.

It is then trimmed up with a knife and rough rasp, and is ready for use to obtain a correct bite. The neater one makes these dummy cases, and the more they approximate to the size of the future set, the better guide they will be to the construction of the set and the arrangement of the teeth. When there are teeth in the mouth which articulate with each other, taking the bite is a very simple matter, it is then only necessary to trim the composition cases, after trying them in the mouth, until the teeth nearly articulate; then to complete the operation, the surfaces of the dummy pieces are softened over a lamp, and the patient directed to close the teeth firmly and keep them so for a short time, or until the composition is again hard. But to obtain the proper closure of the mouth in edentulous cases requires a more delicate and skilful operation.

In this case when the pieces are placed in the mouth they are generally found to be too high, that is, they keep the mouth too widely open, so the pieces must be carefully cut down until all parts of the surface come into contact, and the lips assume their natural position, and there is no strain on the lips in closing the mouth.

We must now soften slightly the surface of the upper piece

and place again in the mouth, getting the patient to gently close on the softened surface, this closely approximates the pieces together, the centre of the mouth is then marked, the length of the upper teeth taken, so that enough, but not too much, of them is shown when the patient talks or laughs. The pieces are then cemented together at the sides by means of a warm instrument. It is very essential that the patient closes the mouth properly,—I mention this because it is not at all an uncommon thing for a patient to give a wrong bite, either by protruding the lower maxilla, or else moving it sideways. Of course, the skill and discernment of the operator should enable him to recognise when the patient is giving a wrong bite, and to take means to remedy it. I find that the position of the patient's head in the chair makes a considerable difference in the closure of the mouth, the more upright it is the less likelihood is there of the lower jaw being protruded. This form of false bite is the most difficult to avoid, the lateral displacement of the jaws being easily recognised by the heels of the models being thrown out of relation to each other when the dummy pieces are articulated.

In some cases, owing to the patient's nervousness, or other causes, it is found necessary sometimes to adjust springs and swivels to the dummy cases in order to keep them steady enough in the mouth for one to inspect them properly. A common set of swivels can be used for this purpose, and if the bolts of the swivels are flattened and warmed and then pressed into the composition they will be found to hold sufficiently firm for the work required of them. With these dummy cases we are enabled to judge of the correctness of our models and also of the stability and holding power of the future cases.

Where the patient is already supplied with teeth in one jaw, it is well to bear in mind that, after the dummy piece has been adjusted to the other jaw and removed from the mouth, the dentist should take an impression of the points of

the teeth in the case the patient is already wearing and afterwards pour plaster into it, as into an ordinary impression. Then he should articulate the resulting model to the marks on the dummy case and mount both in a bite frame. This enables one to dispense with the case that the patient is wearing, as he very often does not like to be left without altogether. Too much caution cannot be exercised in obtaining a correct bite; a few minutes extra time spent at this stage of our work will often save an hour's labour when the case has to be adjusted to the mouth. For gold work it is best to strike the plates at first and then mount the composition on them to take the bite—by this method you test the fit of your plates, which is of considerable importance. In taking bites for simple cases, such as single teeth, or even for the loss of several teeth when there are others at each side of the space—a piece of soft composition may be moulded to the gum and the patient directed to bite into it; to manipulate the soft composition in the mouth the fingers should be lubricated with a little vaseline. When by means of one of the foregoing methods a representation of the proper occlusion of the jaws is obtained the dummy pieces are placed upon the models, and they are mounted either upon a bite frame, or set upon a plaster slab, or in other ways to be described hereafter.

SETTING UP BITES.

The setting up of a bite, is the placing of the models of the mouth in exactly the same relation as the upper and lower jaws bear to each other, and the object is to show with accuracy the amount of space which has to be filled up with teeth in order to obtain a proper and efficient masticating surface.

As models may be set up in several different ways, we will first of all enumerate them, and proceed afterwards to a description of their arrangements and the advantages each possesses.

The Slab bite. Long bite. Heel bite. Bite frames. Small bites in composition.

THE SLAB BITE.—The models of the mouth are taken and crucial grooves are cut in the heels or back of them. (Fig : 31)

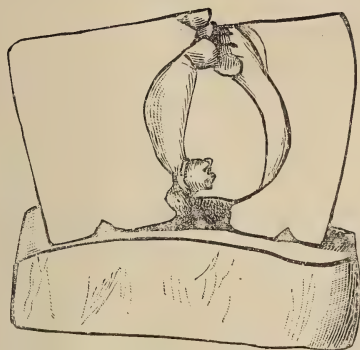


Fig. 31.

The dummy pieces previously described are now carefully adjusted to the models so that they go perfectly home, any portion interfering with this should be cut away. Great care must be observed in doing so, to get accurate results, for an omission will entail a great amount of trouble and inconvenience when the case is tried in the mouth. The two models with the intermediate dummy pieces in position are now fastened together with hard wax, and the grooved ends of the models are painted over with a solution of soap; this will prevent the plaster adhering to them. We now mix up to a thick consistence about four tablespoonfuls of plaster of Paris and spread it on a piece of zinc or glass. It should be spread out so as to just extend beyond the edge of the models which must now be pressed gently but firmly into it, and held in position by the left hand until the plaster hardens, whilst with the right hand the plaster is worked by means of a spatula or knife round the back and sides of the models.

Now, although one may, by mixing the plaster thick, and holding the models in place until the plaster hardens, think he has got a reliable bite, such is not the case, for in the process of hardening an expansion takes place in the plaster slab that always separates the models to an appreciable extent, this rendering the slab bite uncertain in its results. To overcome this expansion somewhat it is best to use an old plaster slab and after trimming roughly into shape dip it into water and on the surface of the slab spread a very thin layer of fresh plaster just enough to form a bed for the models. This thin layer of plaster by adhering to the old portion is controlled and prevented from expanding, at any rate to such an extent as in the method previously described.

The advantages of the slab bite if they can be so considered are, that the workman is able to use models of any thickness, and remove them with the greatest ease for the purpose of fitting clasps of teeth, and it is principally used for gold and other metal work. A bite frame known as Howarth's, sold by the D.M.Co., presents an ingenious modification of the plaster slab in as much as it admits of the free removal of the models—and also of the use of only a small quantity of plaster—but unfortunately the inventor has, to our mind, detracted from the utility of his invention by introducing a lettered surface for the plaster to rest on. The effect of this (when the expansion of the plaster takes place between the raised letters) is to prevent the plaster from going into close contact with the frame again—instead of letters two raised taper ridges crossing each other should be the only attachment. By this arrangement the expansion of the plaster would not affect the position of the models on the bite frame.

The next bite or articulator to be described is:—

THE LONG BITE.—(Fig. 32)—This form of bite affords a much more perfect articulation than the preceding, and may be relied upon to give very accurate results.

To make this form of articulator neatly, two moulds made of strips of zinc or tin are necessary ; the first should be about 7 inches long and $1\frac{1}{2}$ inches wide, and the second the same length, but just double the width of the first.

Two inches of each extremity of these strips are bent at right angles, the back part should represent the width of the model, therefore the two arms will grasp about $\frac{1}{2}$ an inch of the sides, leaving the rest to form the necessary extension to the model. We now proceed in the following manner.

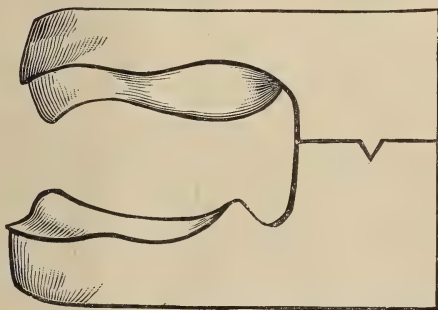


Fig. 32.

The plaster models are cut down to about an inch and a quarter in depth in front, tapering to three quarters of an inch at the back.

About four tablespoonsfuls of plaster are now mixed tolerably thick, and after moistening the under surface of the plaster model, a quantity of plaster sufficient to make the model level again is placed on a sheet of zinc or glass and the model pressed gently into it, thus there will be about half an inch of fresh plaster under the back of the model, while at the front part there will only be a slight film. The zinc frame is now placed in position, just embracing the sides of the model, and it is then filled up with plaster level with the surface of the frame, this will give us the proper height and amount of extension necessary.

When the plaster has set, the surface is smoothed, and transverse grooves are cut in it. The upper model and dummy pieces are now adjusted to the lower part and fastened in position by hard wax. The fresh plaster surface of the lower part of bite is now painted with a solution of soap, and the deep zinc frame is adjusted to it in the same way as

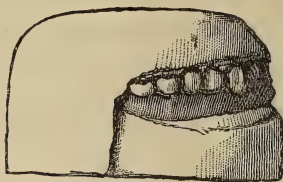


Fig. 33.

described for the narrow frame. Some plaster is now mixed up, and it is moulded to the surface of the upper model and the lower bite, and the frame filled up level as before. When the plaster is set, and the zinc frame removed, we should have a bite as represented in the cut.

It is necessary now to hollow out a portion of both upper and lower extension, so as to get a good view of the backs of

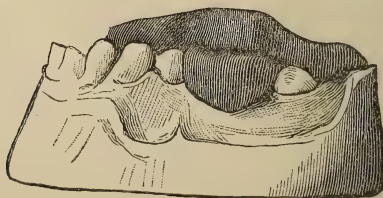


Fig. 34.

the teeth when mounting them. The advantages of this form of bite are that any expansion of plaster will affect it equally, both in the molar and incisor regions, and if neatly made these bites are very handy to work to.

The heel bite (Fig. 33) is one more often used for remodelling

cases, and is made in this way. The model is taken and the case to be remodelled is fastened to it. A piece of wax is now softened, and the palate portion of the case is built up level with the teeth, a transverse groove is now cut in the heel of



Fig. 35.

the model, and lubricated with soap, whilst to the wax and teeth a little oil is used. A quantity of plaster sufficient for the purpose is now mixed pretty thick and worked over the back of model, and brought forward until it covers the crowns and points of the teeth, it is now allowed to get hard and then separated from the other portion.

For partial cases of two or more teeth, and where there are

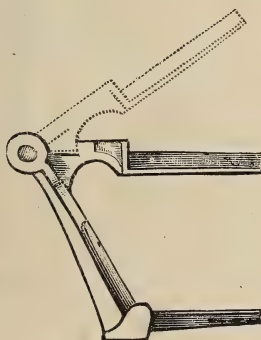


Fig. 36.

teeth on each side of the gap, a little soft composition may be pressed into the composition dummy, and extended so as to rest on the neighbouring tooth or teeth. The dummy case should have been oiled, and after pressing the soft composition

into it, should be dipped into cold water and separated; by this means a small bite can be accurately made in two or three minutes. (Fig. 34, 35)

We now come to bite frames, and we must give these most consideration, as it is by this means we obtain the most accurate results.

A bite frame to be effective should be simple in construction, not liable to get out of order, and should be so arranged that the models may be fastened to, and removed from it without any fear of altering the articulation. The bite frame that is illustrated is one that has the merit of both these qualifications, and is to be depended on for the most accurate results. By referring to Fig. 36 it will be seen that there is only one joint to be looked after, and that any interval existing between that joint will at once point out that the bite is too high, or in other words, that the teeth come in contact

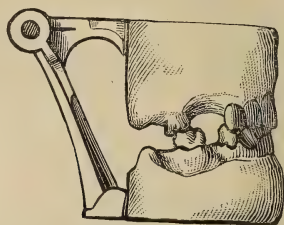


Fig. 37.

with each other too soon. To arrange the models on this frame, it is necessary to trim them down so that when fastened together, they can be placed between the two arms without in the slightest degree raising the hinged upper one. The two bevelled and taper portions of the arms are now oiled, some plaster is mixed and spread over the lower arm, and the models placed so that the arm comes exactly in the centre, and near the anterior part of the model. When the plaster has set, some more is spread on the upper model, and then the upper arm is pressed down into it until the joint comes per-

fectly close. The plaster is now smoothed around the models and arms of frame, and is allowed to harden. By previously oiling the frame the plaster models can be removed at will.

If the models are for vulcanite work it is more convenient to taper the sides, and soap the bottom of the models, but if this is done grooves must be cut in the sides to form retaining points for the plaster to hold to. If, however, the models are for plate work, they should be made to adhere firmly to the added plaster, so that they can be removed from the frame and re-adjusted again in case they are wanted at some future time.

When using any bite frame, the models should be brought together without the slightest jar, and care must be taken that the points of the teeth are kept absolutely perfect.

In the case of a model used as a bite it is best to dip the points of teeth in hot stearine or melted wax, or to give it a coating of shellac varnish ; this will prevent the red paint, afterwards used, from drying and accumulating on the teeth; one is then able to use a very thin coating of paint.

(To be continued.)

DENTISTS IN ALSACE-LORRAINE.—According to the census there are only twelve dentists in the whole of Alsace-Lorraine. The number of medical men is 653, but of these 149 are army doctors. Of the 504 civil medical practitioners, 83 possess French diplomas, being a diminution of 7 on the figures of last year.

At a general meeting of the Dental Association of Victoria, held on December 14 last, a resolution that the association be wound up voluntarily, was carried, and it was subsequently confirmed on Jan. 4.

British Journal of Dental Science.

LONDON, APRIL 15th, 1895.

SCHOOL CHILDREN'S TEETH.

Readers of the JOURNAL are aware that we have frequently drawn attention to the facts accumulated at home and abroad as to the shocking prevalence of decay in School Children's Teeth. There can be little doubt but that within the last few years the subject has been very fully investigated, and the question which now presents itself is as to the best manner of applying our knowledge in order to secure the greatest benefit to the community. The matter is one of such extreme importance that no apology is needed for again directing attention to it. The examination of 10,500 children in Great Britain showed that they possessed 37,000 unsound teeth, and that in the opinion of the observers 22,000 of these teeth should, according to modern ideas of Dental Surgery, receive other treatment than that by extraction. In a most interesting communication by Dr. RÖSE which we published last year, the statistics went to show that in those districts in which the soil and the water were deficient in lime salts, the teeth were more prone to decay. As many as 98 per cent. of the children had carious teeth.

But however interesting such suggestions as to etiology may be, at the present moment we are concerned with the practical aspect of the facts obtained. Dr. RÖSE has himself examined more than 13,000 children, and he thinks that the results he sets out ought to suffice to convince the authorities that some hygienic measures in the public schools are necessary. Apart from the question of appointing Dentists, he suggests that the children should be instructed as to the advantage of having good teeth. There should be

a good manual on the subject of dental and oral hygiene for the teachers and pupils, and a short note on the subject in the school text-books. In order to convey instruction by the eye, he would have hung upon the walls a picture of the human dentition, a tooth-brush and a tooth-pick. The latter requisites should be provided for poor children, and prizes awarded to the owners of the best-cared-for teeth. In the lime-impoverished districts the diet must also be attended to.

All these things are no doubt good, but now let us turn homewards and see what is to be done. Appointments of Dentists to Parochial Schools have been, and are still occasionally being made. But at present the large number of children attending the Board Schools have escaped any systematic supervision, and the only treatment practised, in the very large majority of cases, is extraction. Mr. FREDERICK CONSTANT, in an able paper published in the *Guy's Hospital Gazette*, is not far wrong when he says, "by the time such a child leaves school, say at twelve or thirteen years of age, the four first molars have probably gone, and the bicuspid and front teeth are largely carious." He agrees with Dr. RÖSE that the only way to reach "the people" is through the Schools, but he readily admits, as all others have done who have given the matter consideration, that the way this is to be managed is full of difficult complications. He would appeal to the parent, the teacher, the School Board, the County Council, the Local Government Board, the Education Department, and even to Parliament itself. Three Board Schools with over 4000 children are within easy reach of Guy's Hospital, and the teachers have met Mr. CONSTANT's enquiries in the best manner. One of them has indeed asked that a few simple lectures, on the care of the teeth, should be given at his School. Briefly, the scheme which Mr. CONSTANT propounds is that 150 of these children should attend the Hospital every Saturday; this day is the only one which would not interfere with school-work and might be reserved for such patients. But the financial difficulty seems the greatest, and a proposal to charge the "usual sixpence for a filling" would prove a

stumbling-block, besides raising the ire of some dental practitioners who do not approve of encouraging people to become hospital patients by the payment of a small fee. We, however, hope that some attempt will be made at Guy's to test the possibility of Mr. CONSTANT's proposal. There is much reason in Mr. HOPSON's criticism that it is no good talking to the present parents. We have always thought that the parents' consent and co-operation will unfortunately be lacking even when the superior authorities (as will some day be the case) have been converted and arranged for something to be done. Much good, however, can be done by instructing and treating, whenever possible, the present generation of children, who will naturally become the parents in the future happy age !

ALUMINIUM.—In connection with the suggested use of Aluminium for Dentures, it is interesting to read what Mr. A. Liversidge says in the *Chemical News*. He finds that although the absolutely pure metal may be permanent in the air, the best kind to be ordinarily obtained is very little, if at all, superior to zinc. It seems, therefore, that as a non-oxidising material, we must not imagine that Aluminium can in any way take the place of gold or silver. Mr. B. J. Roman has invented a solder for use with Aluminium and its alloys. It requires no flux, and although a soldering iron of Aluminium is thought preferable, any similar tool may be used. The following is the composition published in the *Technical World* :—Silver 2, nickel 5, aluminium 9, tin, 34, zinc 50.

THE TREATMENT OF WOUNDS.—In a paper read before the Cambridge Medical Society, SIR GEORGE HUMPHRY remarked that there are two main points to be attended to in the treatment of a wound. In the first place an endeavour should be made to reduce to a minimum the

media upon which organisms act, and secondly to reduce the latter themselves to a minimum. In order to secure these results as far as is practicable, vessels are carefully secured and pressure is made in the region of the wound. Thus oozing and accumulation is prevented, whilst by antiseptic precautions we endeavour to secure the wound against the access of micro-organisms. In such a case there is nothing to interfere with the natural process of healing. The use of catgut ligatures has apparently diminished the risk of secondary hæmorrhage. and blood-poisoning, erysipelas, and tetanus are less common since the introduction of the antiseptic treatment.

THE SALE OF GOODS ACT, 1893.—In the Chesterfield County Court, last month, a Dentist sued a tradesman for ten guineas for work done and materials supplied. Plaintiff said the defendant “gave him an order” for teeth to cost the sum mentioned. He extracted five stumps, and at once took an impression of the mouth. The Judge questioned this line of treatment, and declined the plaintiff’s suggestion that he could guarantee a perfect fit for his Honour by such a method. The defence, however, was the interesting part of the case. It was contended that plaintiff could not recover because under Section 4 of the Sale of Goods Act, any transaction of £10 and upwards could not be enforced by action unless some amount was paid as an instalment, or some memorandum in writing was given. The Plaintiff was recalled and said that the material used would cost £6 or £7, to which the Judge replied that the professional skill of putting these things together seemed to be a large proportion of the cost. He non-suited the Plaintiff, and suggested he should sue for five guineas damages for non-acceptance of “the goods.” His solicitor submitted that fitting the teeth was rendering professional services. To this His Honour is reported to have replied, “The tailor who makes clothes uses considerable skill, but he would not call it professional services!”

THE ART OF CASTING METAL.—With reference to the communication, in our last issue, from Mr. Fletcher upon the Art of Casting and Working Sheet Metal, we understand that several Continental and American Schools have already availed themselves of his offer. The sets promised by Mr. Fletcher will take two or three months to get together, and all applications must be sent in by the 25th instant.

THE BOARD SCHOOLS AND RECRUITING.—Mr. Constant, to whose paper we refer elsewhere, should be interested in the suggestion recently made by a clergyman in the East End to the Chief Recruiting Staff Officer. The Vicar says that thousands of Board School children can obtain no employment when they leave, and as the State has already to pay for their education and largely for their food and raiment, it should adopt all unemployed boys of fourteen years of age, and bring them up as soldiers and sailors. But it must be remembered that unless they can pass the "tooth test" they will be refused by the examining medical officer. We would ask the Vicar to read Mr. Constant's paper in the hope that he will then be ready to help in securing that no Board School boy should be refused as a recruit on account of bad teeth.

FORMAL.—Have any of our microscopical readers tried Formal as a hardening agent? It has been recommended by Mr. C. D. Marshall who used it for making sections of eyes. It dissolves in water to the extent of 40 per cent., readily penetrates tissues and hardens them with great rapidity. A ten per cent. solution for twenty-four hours gave good results. Formal is a powerful antiseptic.

THE EDINBURGH STUDENTS' MENU.—We give a report of the Dinner elsewhere, but we are unable to reproduce the Menu and Toast-List which is before us. It is illustrated, as usual, but the sketches, although cleverly done, would scarcely be in place in the pages of a Dental Journal. They refer very largely to a supposed "New Woman" in Dentis-

try, and whilst one can find no dissatisfaction in "A Lady of Polish" making herself in a mess at the lathe, it seems scarcely fair or appropriate to depict in black and white other attitudes not so becoming or useful. If report speaks truly, indeed, the Dean of the School has felt himself obliged to protest against the intrusion upon bed-room details, and has taken measures to suppress the illustrated card. We understand that in the second edition, which was in consequence demanded, the objectionable figure received additional raiment. The least we can do is to express our satisfaction that even in our unexpurgated copy the artist allowed the lady to hide her face.

THE EXTRACTION OF TEETH.—In his Thesis for the doctorate, Dr. Eugène Guérard discusses the possibility of septic affections in connection with the extraction of teeth. He records a dozen cases in which ordinary extractions have been followed either by serious necrosis of the jaws or by diffuse abscess, phlebitis, and meningo-encephalitis. In one fatal case erysipelas commenced at the wounded gum, and was due to the operator's negligence. There is only one way of avoiding such troubles and that is by regarding tooth-extraction not as a simple operation without danger, but as one which leaves a wound difficult to treat and often accompanied by serious lesions. It should be practised therefore with all antiseptic precautions possible.

THE NEW PRESIDENT OF THE COLLEGE OF SURGEONS.—Mr. Christopher Heath, whose classical work on "Injuries and Diseases of the Jaws" is known to most Dentists, has been elected to fill the vacancy caused by the lamented death of Mr. J. W. Hulke. The new President has been connected with the working of the College for many years, having filled all the other offices, and his appointment was generally anticipated. His skill and ability as a Surgeon may possibly be partly the result of heredity, for we believe that he is a grandson of a naval surgeon who served on Lord Howe's flag-ship in 1794.

DRINK AND ACCIDENTS.—The Hon. Sydney Holland, the Chairman of the Poplar Hospital for Accidents, is often asked what proportion of the cases may be attributed to drink. Accordingly he writes to *The Times* to say that for the last six months a register has been kept. An analysis shows that on an average 45 cases have been brought to the door daily, including Sundays. "The result disposes once and for all of the idea that the majority are caused by drink." 3,166 accidents occurred at home, 2,415 at work, 1,720 in streets, 303 only as result of drink, 155 assaults, (not drunken assaults), 517 teeth extracted—total 8,276. The only criticism we would offer is as to the last item. The extractions were accidental! Why?

A GRIEVANCE AGAINST A DENTIST.—In a case at the Marylebone County Court, the plaintiff, a dentist, sued the defendant, a lady, for £20, some of which was for artificial teeth. On an account being rendered after four months, the teeth were returned with a message that they were of no use. The plaintiff judging by the condition of the denture was of an opposite opinion, and the defendant admitted that she wore the teeth on going out for appearance' sake. She, however, was unable to visit her friends, and her counsel submitted that a woman in Society who is prevented from talking now-a-days, has a legitimate grievance against her dentist. Judgment was given in favour of the plaintiff, as it was held that defendant had accepted the teeth, but after further remarks the Judge ordered the denture to be returned to the plaintiff and reduced the claim to £17.

A WATERPROOF TRAY.—According to the *Scientific American*, an inexpensive photographic tray or battery cell, which is practically water, acid, and alkali proof, may be made out of a paste-board box by covering it with a coating made by melting together equal parts of paraffin and

gutta-percha chips. Such boxes may be utilised for many other useful purposes. The method of preparation is as follows :—The gutta-percha should be melted first over a slow fire; the paraffin is then added and the whole composition thoroughly mixed and brought into a very fluid condition. The box, or box cover, should be made dry and warm, and the composition is then poured into it and allowed to run along the edges so that the entire inside of the box is waterproofed. After the excess has been poured off the box is allowed to cool. If any bare place has escaped, some of the composition can be afterwards applied with a hot iron, which can also be used to smooth up any unevenness of the surface.

PRESENTATION TO MR. ANDREW WILSON.—At the Annual Dinner of the Odonto-Chirurgical Society, an opportunity was taken of presenting a handsome timepiece to Mr. Andrew Wilson on his retirement from the Dental Hospital School after sixteen years' service. Mr. Bowman Macleod in making the presentation, alluding to the good work done on behalf of Dentistry in general and the Hospital in particular, said that Mr. Wilson was retiring not because he had grown tired of serving his Profession, but he saw behind him many young men, and retired in their favour. Mr. Wilson at the end of his reply of thanks proposed the toast "Continued prosperity to the Dental Hospital and School."

CIVILIZATION AND DOGS' TEETH.—According to a writer in *The Sun*, a dog has had ten teeth removed in consequence of caries, and his devoted mistress is now daily brushing the remainder with a little Condyl's Fluid and water to preserve them. "Our canine friends are beginning to feel the effects of the more artificial lives they many of them lead, and it is having a bad effect upon their constitutions and particularly so in regard to their teeth."

Manipulative Miscellany,

It is requested that all new instruments or articles which it is wished to have described under this heading, be sent *for inspection* to the publisher not later than the 8th and 23rd of each month; they can be returned in a few days. Where, from the size or otherwise, this is impracticable, a clear and minute description will be sufficient; the sole object being to give practitioners a description of everything new, on its own merits and without any intention or wish to pit one against another. All makers, vendors, and inventors, are invited, with strict impartiality, to contribute towards this end.

COMPOUND CAPSICUM PLASTERS.

The Dental Manufacturing Company Limited, send us a sample of the above, prepared from a formula of Mr. G. W. Watson, L.D.S. They are of a convenient size, about half an inch long, by a quarter of an inch wide, and are simply pressed into position with the unvarnished side next the gum.

A NEW MALLET.

We have received from Herr Paul Buss, of Berlin, a specimen of a new mallet which he has just patented. It is for use with the dental engine, and can be employed either as a right-angled mallet or, by changing the point for a screw plugger, as an ordinary straight instrument. By pressure upon a small spring near the end, the movement is instantly stopped; there is also a sliding mechanism, on the other side, by which the force of the blow is regulated. It is claimed that with the strongest blow attainable, one may use the instrument for an enamel chisel.

Dr. Swan, the medical officer of health of Batley, is reported to have said in speaking on the danger of leaden pipes, that they are degenerating thousands. A degeneration produced by the cruellest of slow poisons—"a poison which destroys men's bodies, minds, morals, and intelligence, and from which the majority has no means of escaping."

Abstracts of British & Foreign Journals.

PORCELAIN-FACED BICUSPID CROWN.

By A. W. McCANDLESS, D.D.S.

The root having been properly prepared, a band is fitted thereto exactly as though an ordinary telescope or shell gold crown were to be made.

The buccal side of this ferrule is cut out with curved shears at about where the porcelain facing is to be placed. Secure a perfect articulation in the usual manner, and then tack the cusp to the ferrule at a point the farthest from the porcelain ; now, with the curved shears, cut away the gold of the cusp down to the point of the cusp, approximating the shape of the porcelain face at that end. Grind the facing, and trim the opening in the gold that is to receive it, until the fit is fairly accurate, but not absolutely so, however, as this is entirely unnecessary, and requires too much time.

When the facing has been ground to the proper shape, remembering to always make it a trifle smaller than the space to allow for the thickness of the gold backing, bevel the edges of the porcelain all the way around, then when the gold backing is thoroughly fitted, which is only accomplished by thorough painstaking, annealing the gold often, and gently tapping to place with a small rivetting hammer, place the tooth, backed with pure gold of thirty gauge, in position. Catch the gold backing to the ferrule and cast with sticky wax, slip the porcelain off, invest the gold in long fibre asbestos, moistened with water, leaving only enough gold exposed so that with a small particle of solder, the backing may be united to the ferrule, remove the investment fill the joints, where the solder is to flow, with wax, fill the entire interior of the crown with a paste of plumbago, or stove polish so that the solder will not flow where you would not have it go, then complete the soldering of the joints and flow up sufficient solder to give the proper contour to the finished crown. At this point a lower grade of solder is used for filling the cusps. The porcelain facing is slipped to place, the gold filed or ground to the proper shape and finish, and if the work has been properly done up to this point, a perfect joint

between backing and tooth is the result. Remove the facing, then with a thin film of cement between the gold and the porcelain force the facing to place.

After the cement has set bend the pins of the tooth carefully outward from each other, and the facing is held with sufficient strength. In making these crowns 22 carat gold, 28 guage and 22 carat solder is used, with 14 carat solder in the cusps.

After the crown has been finished and polished send it to a gold plater, who will plate it with pure gold, which gives it a very beautiful appearance.

The plating is not designed to cover any pits or other defects caused by faulty manipulation, as it brings them out and magnifies them, but a crown thus treated will not tarnish in the mouth and the plating is quite durable where no friction comes, and where friction is the tarnish will not come.

There are a good many things to commend this form of crown—natural appearance, strength, and utility. No risk is incurred in soldering, the colour preserved, permitting more artistic effect in matching the natural teeth and the absence of that blue line so common at the cervical margin of soldered teeth.

The Dental Review.

THE ANTISEPTIC PROPERTIES OF FORMOL.

At a meeting of the Paris Academy of Sciences, M. Friedel read a paper, by M. Trillat, concerning experiments that have been made on an extensive scale with regard to the antiseptic properties of methylic aldehyde vapours (commercial formol). M. Trillat did not use solutions of formol for producing the vapours, but the producing apparatus which converts the methylic alcohol directly into formol. He tested his apparatus in rooms varying in size from 20 to 300 cubic metres, the walls having been covered with germs of very resisting nature at different heights. Various infected articles were also placed in the apartments. The results allowed the conclusion to be formed that the vapours took effect equally well both as regards height and depth. The force of penetration of these vapours appears to be so great

that, although they were used to an almost infinitesimal degree, drapery infected with germs was entirely purified, the various septic agents contained in it being destroyed. Even wood was penetrated to a considerable depth, and M. Friedel drew attention to the fact that similar results could not be obtained by the vapours of any other substance.

Chemist and Druggist.

Reviews.

General Surgery and Pathology for Dentists. By Edmund W. Roughton, B.S., M.D. (Lond.), F.R.C.S. Eng. With numerous original illustrations. J. P. Segg & Co., London, and S. S. White & Co., Philadelphia, U.S.A.

Many of our readers will have noticed, and probably benefited by, the series of excellent articles on General Pathology and Surgery contributed by Mr. Roughton to our pages last year. Now that they are published in book form we may be excused if we notice them. The work is thoroughly up to date, the matter well chosen, the style clear, and the illustrations original. We must leave others to criticise in more detail, and content ourselves by expressing the belief that Mr. Roughton's experience on the teaching Staff of a Dental, as well as of a General Hospital has helped to produce a text-book which will be appreciated not only by the Student, but also by the Practitioner.

Vulcanite Work. By Harry Rose, L.D.S. Eng. With numerous original illustrations. London : J. P. Segg and Co.

The contents of this book also have previously appeared in serial form, and represent the author's teaching to a class of Students. He apparently aims at making his instruction practical rather than historical, and gives the results of his own experience and the methods he himself prefers.

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, March 4, 1895. Mr. R. H. Woodhouse, M.R.C.S., L.D.S., Vice-President, in the chair.

The Minutes of the previous meeting were read and confirmed.

The following gentlemen were ballotted for and elected resident members of the Society:—A. E. Baker, L.R.C.P. Lond., M.R.C.S. Eng., L.D.S. Eng., 22, Grosvenor Street, W.; Percy Franklin Henry, L.D.S. Eng., 79, King William Street, E.C.

The following gentleman was ballotted for and elected a non-resident member of the Society:—Ridley Herschell, L.D.S. Eng., 6, Seaside Road, Eastbourne.

The following gentlemen were nominated for membership of the Society:—Leslie Maury Stocken, L.R.C.P. Lond., M.R.C.S. Eng., L.D.S., Winchester House, Ealing (resident); Francis R. Flintan, L.D.S. Eng., Tower Lodge, Weybridge, Surrey (non resident).

The Chairman said two gentlemen, non-resident members, had signed the necessary obligation forms, viz., Mr. William Simms, of Manchester, and Mr. Thomas Llewellyn Nash, of Inverness.

The Librarian reported the reception of the usual transactions and periodicals, and also the receipt from Dr. Grevers, of Amsterdam, of two bound volumes of Transactions for 1878-9, and 1879-80.

The Chairman said the Secretary had received a letter from the Laryngological Society of London, dated February 18, inviting the members of the Odontological Society to be present at, and participate in a discussion on the "Diagnosis and Treatment of Empyema of the Antrum," on March 13. Owing to the illness of the reader, the paper announced for that evening had been postponed. In the absence of the paper a good many Casual Communications had been promised, by means of which they hoped to have a pleasant evening.

CASUAL COMMUNICATIONS.

Mr. ROSE said, as some sort of apology for introducing so elementary a subject to the notice of the Society, it was not his intention to describe the ordinary daily routine of taking impressions of the mouth either in gutta-percha, wax, plaster of Paris, or composition, but he would try and illustrate one or two methods of taking impressions of mouths in which the teeth were so situated as to render it difficult, if not almost impossible, to take an impression in the ordinary manner. The success of the first operation depended upon the shape of the impression tray. It need scarcely be mentioned that the impression tray should approximate in size and shape to the model for which it was intended. It should be slightly larger, but still following the same outlines, so as to admit a sufficiency, but not an overplus of the modelling composition. By reducing the amount of composition to the smallest possible quantity, the patient was able to tolerate the tray more readily, ensuring a more perfect and reliable impression. A common error in taking impressions of the mouth was the idea that it was necessary to take the impression on both the labial as well as the lingual aspects of the teeth. Taking a typical case, where eight front teeth were standing, and from the recession of the gum, or other causes, were long and straggling, the teeth would be seen to present a series of cones, the broad ends represented by the points of the teeth. When the impression tray was inserted in the mouth, and the material flowed in between and around these teeth and was allowed to harden, one of two results must take place—either the teeth would be drawn up in the mouth, or the composition would be pulled out of shape. Fortunately, the latter was usually the case. If, instead of using an ordinary impression tray, they employed one with the front portion of the tray cut away, it would be seen at once that such a tray could be more readily removed from the mouth than one which took the labial aspects of the teeth as well; and at the same time it would allow of the composition being kept in the mouth until all danger of dragging had ceased to exist. Formerly, one of their greatest troubles was the length of time the composition took to harden. This could now be overcome by using what was known as the irrigated tray, *i.e.*, a tray so constructed that a volume of cold water was made to circulate through it. The effect of this on the composition was to the uninitiated perfectly aston-

ishing. The moment the cold water circulated through the tray the tray itself became stone cold, and the composition was hardened in one or one and a quarter minutes. He had not the pleasure of knowing who was responsible for the invention of the irrigated tray, but his knowledge of it was derived from Mr. W. R. Humby, who had used it in practice for a number of years. With the ordinary irrigated tray for taking the front part of the piece as well as the back, the tray became so securely fixed in the mouth that it was sometimes impossible to remove it unless great force was employed or the composition re-softened. With a tray such as he had described, with the front portion cut away, no such danger existed; a most beautiful and accurate impression of the mouth could be taken and at the same time one that could be easily removed. The next class of cases was that where undercuts were presented, and it was necessary to take them in sections. A typical case was that of a mouth in which the second bicuspid and the first molars on either side had been removed; the second molar would perhaps have a tendency to lean forwards, and the first bicuspid the same tendency to lean backwards, giving a considerable undercut space. In taking an impression of a model such as that it was as well, after lubricating the fingers with a little vaseline, to take a little soft composition and mould it into the spaces represented by the loss on either side. Those pieces could, if necessary, be removed from the mouth and trimmed up so that sharp edges were presented instead of their being round. When the pieces were re-inserted in the mouth the impression could be taken in the ordinary way; the pieces were left in position in the mouth and could be re-inserted into the impression tray after its removal. Where there was an extreme undercut it could be taken in two pieces, using pieces of German silver roughly bent up into shape so as to support the composition in the mouth. In the first place the impression of the lingual aspect and half the cavity was taken by one portion, a piece of plate supporting it in position. A guide was made in the centre of a piece of composition, and another piece of plate was taken, forming a little tray upon which some composition was moulded. That was then taken, and after the first piece had been removed and just a little vaseline rubbed upon it a second piece was pressed on the first. If it were found there were not sufficient guide to hold the two pieces firmly together, another small piece of composition could be placed over the two pieces, forming a

little lock, and fastening them. This method answered admirably for cases where for absorption of the gum in front of the mouth it was necessary to take an accurate representation of the gum where no extensive recession had taken place. A small piece of German silver was bent to shape, a little composition moulded on it and pressed into the plate. It could be moulded accurately into position and smoothed up so as to bevel it upwards towards the point. This method depended for its success first of all on using an impression compound perfectly free from elasticity; secondly, on lubricating the fingers with vaseline while rubbing it; and thirdly, on employing the smallest amount of composition and supporting the composition properly during the process of hardening. He had said nothing new, and his only excuse was that he considered taking impressions of the mouth one of the most important operations in dental procedure.

The CHAIRMAN said there was no need of apology on Mr. Rose's part for bringing forward this important subject, as it was one which appealed to them perhaps more than any other in their daily work. Without a good model they could not have good work. Mr. Rose had shown a good deal of skill and mechanical ingenuity in devising the means he had adopted, and it would be interesting to hear the experience of other members in the same line of work.

Mr. COFFIN said it would be of interest if Mr. Rose could state his views as to the desirability of making special cups and trays for cases as they presented themselves. They had often to ask themselves whether rough impressions should always be taken from which special trays should be made, or whether they should be satisfied with having a large range of ordinary cups which could be adapted to special cases. There was always a difficulty in one's mind as to which course should be pursued. It would also be useful if Mr. Rose could state whether he had any useful and simple method of making special cups to meet emergencies.

Mr. W. R. HUMBY said having used the irrigation tray for many years he felt some kind of diffidence in speaking on the matter, because it seemed to be a thing that had been invented by he did not know how many hundred dentists at different times during a period extending over ten years. Without receiving any previous information from anyone he had himself used it independently, and introduced it to his classes, and it was not until that had been done that he heard it had been introduced in other ways. With regard to the tray, it went

into the mouth without any extra resistance, and certainly the wax maintained its shape during dislodgment. It was necessary to be careful not to take club shaped teeth with it, or it would set so hard that it could not be removed. During the time he had used the tray, taking about 90 per cent. of his cases in that manner, only on two occasions had the tray become firmly fixed, and both them were easily removed by substituting warm for cold water in the circulating arrangement. He had adopted the plan of putting a little lubricant over any teeth which presented unusual difficulties, and found that a little ordinary soap was even preferable to vaseline. There were many soaps which were absolutely tasteless and a little could be applied with the finger slightly moistened over the point of the tooth. It facilitated removal; the material seemed to have intimate contact with the tooth and easy liberation was ensured. It was necessary to have rather a large range of trays, and they were rather expensive to make, but the results must be admitted to be superior to those obtained by any other method. He had perhaps seventy or eighty trays, and when from time to time they got a specially good shape not previously in stock, two or three trays were made. He should be very happy to furnish a description to any member of the process of making trays, so that members might be able to start really where he was leaving off, and perhaps improve on his methods.

Mr. W. HERN said in cases where teeth were long and straggling, with large triangular cone-shaped spaces between them, in using a special tray having no front surface the composition was liable to drive in between the spaces. In such a case, he was in the habit of filling the spaces with a little pellet of cotton wool or amadou or anything which would prevent the gutta percha from running in between the teeth. The difficulty of the undercut he had nearly always got over by taking a piece of Gilbert's gutta percha, which seemed to take the space very accurately, and was not difficult to remove.

Mr. CUNNINGHAM said the communication and the discussion seemed to have gone upon the idea that modelling composition was the only material to be used in taking an impression. He (Mr. Cunningham) would be willing to submit a comparative model by the method to which he would refer, and which he also owed to another member of the Society. Mr. Rose had laid down as a kind of axiom, that if it were desired to

take a good impression, the closer the impression tray corresponded to the particular case, the more likely were they to get a good result. In the method he (Mr. Cunningham) adopted he took first of all a rough model, had a special tray made to that, and then used gutta percha for taking the impression. With regard to undercuts he would ask, supposing they took a great deal of trouble to get the undercuts, taking a model as it were in two parts, as he had done several times, getting a very perfect model with the base of the triangle at the margin of the gum, and making the plate to fit that; what were they going to do then? In all these questions of taking impressions the personal equation was no doubt very important, but it was rather strange that no one had risen to speak on the question of a plaster impression. He did not forget their obligation to Mr. Coffin for having introduced gutta-percha material, first of all making a rough impression and making a final impression for the special case afterwards, and furthering also the proper use of gutta-percha. Whenever he had an edentulous case his habit was to take some renovating compound and use that when using modelling composition. Like other members he had been very much interested in Mr. Rose's communication, and none the less so because his practice differed so much from that of Mr. Rose.

Mr. W. A. MAGGS said when he was secretary of the Society, some three or four years ago, he brought forward on behalf of Mr. Farnsworth, of Manchester, an irrigation tray. He did not know whether Mr. Farnsworth originated it, but as far as he knew that was the first time that the irrigation tray was brought forward at that Society.

Mr. W. R. HUMBY said he had been using them for several years when that was introduced. The Dental Manufacturing Company had made trays for the last ten or twelve years. Practitioners in different parts of the country had originated the same idea, and although there was originality in each case it could scarcely be said where the priority lay.

Mr. REINHARDT said his trouble had always been in taking impressions, especially the lower, where all the teeth were standing and where both inside and outside impressions were taken resulting in a tremendous drag. The composition ran in so far between the teeth that when it got very hard he had great difficulty in getting it out. He had never used the irrigated trays, but he had used a saliva ejector and the ordinary bulb syringe with cold water. He would like to

know what method Mr. Rose employed when the impressions became so very hard.

Mr. BALDWIN said the reason that many members had not risen was not because they did not use plaster but because they were glad to hear of other processes which seemed to offer good results. Personally he used more plaster than any other material for taking impressions, almost always so in cases where the teeth seemed as if they would adhere to the impression material so that the impression would not be easily withdrawn. Plaster had the disadvantage that it was often very difficult to put together and took a good deal of time. It would not do to let the impression drag at all, or if it were allowed to drag it must be after it had got almost hard, otherwise the drag would extend for some distance round the tooth, and when the plate was made, although it would easily slip into the mouth, it would be found that it did not come close up to the teeth, but there was a space into which a thick piece of card could often be pushed. That was especially lamentable when there were bands right round the teeth, and where the band being made of vulcanite, on the inside of the molars for instance, could not be bent into close apposition. Personally he always had a special tray made for each case. It was made to a rough model and cast in tin without a handle, the handle being soldered on after the casting of the body of the tray. This was very easily done, the whole casting process not occupying more than ten minutes, and having the tray cast in tin instead of Britannia metal the solder melted at a lower point than the tin of the tray. With regard to priority of invention, he had seen an irrigation tray eleven years ago. He would like to ask whether the process of swabbing an ordinary tray with cold water and using a saliva ejector would not answer the same purpose as the irrigation tray.

Mr. BADCOCK thought that with gutta-percha and plaster anything could be done that was required. A special tray was of very great advantage, and he had found gilding metal a very useful material for making them in; for this hint he was indebted to Mr. Morton Smale. It was a softish metal easily struck; and having struck the tray, on putting it into nitric acid for a few seconds it became clean and of the colour of gold. It was neat and clean in appearance, and did not involve any labour in polishing. Gutta-percha had the advantage of not only taking undercuts with extreme faithfulness but of remaining soft to the end. It was not wanted to get hard in the mouth, and there was the great advantage in the

case of loose teeth that a perfect undercut could be got, and there was no drag on the teeth. He had practically abandoned the use of composition in favour of gutta-percha and plaster. He used plaster almost exclusively in plain cases with no teeth or one or two teeth standing. When an undercut was required he could always depend upon gutta-percha, and the result was very good. The only objection to it was that it had to be kept in the mouth for some time longer than when composition was used.

The CHAIRMAN asked Mr. Badcock if the temperature of the gutta-percha was not sometimes an objection.

Mr. BADCOCK said that although water had to be used very hot for melting gutta percha, nevertheless, owing to some peculiar quality it did not burn the patient anything like so often as composition. One reason was that after putting the hot gutta-percha into the tray, the whole thing was dipped into cold water before inserting in the patient's mouth, and he found that complaints as to temperature were rare.

Mr. STORER BENNETT said they were indebted to Mr. Rose for an extremely interesting discussion, more especially as it had brought out some two or three opinions on the subject that he had introduced. He was quite sure that Mr. Rose did not claim any originality for his method of taking models, and it would be within the recollection of the members that some four or five years ago Mr. Andrew brought forward a method, practically the same as the present one, taking undercuts by means of cores, and long before that time the method was one known and practised by a great many members of the Society. Like Mr. Cunningham, he felt inclined to challenge Mr. Rose's statement that the only method of taking these undercuts was the one that he had suggested. Undoubtedly, gutta-percha could be used for some purposes, but his own pet method of doing it was by using plaster of Paris. He had never seen any undercuts that could not be taken by that means. It had this advantage, that by carefully watching the time of setting of the plaster of Paris, the mould could be removed piece by piece, securing an impression of the loosest teeth. Whilst agreeing with Mr. Cunningham as to the merits of different kinds of composition he could not help challenging the statement that when this admirable impression of the undercut had been obtained it was of no value. He was sure they could not have too perfect a model. They could always fill up anything if necessary, but if they had not got it to start with they were working at a

disadvantage. He believed that every undercut could be, as a rule utilised, and a little method that he brought before the Society, two or three years ago, of inserting plates, not by pushing them down between the teeth, but inserting the plate from the lingual side, and pushing it out towards the buccal, utilised the undercuts to a very large extent, enabling them to be of great advantage, because by the fact of the cavity being V-shaped with the base towards the gum the plate was held in position and could not possibly rise. He therefore believed that the greatest advantage was derived from having the most perfect work, and could not agree that the undercut when it had been got was of no use.

Mr. ROBBINS said he had been waiting to hear if one other plan would be mentioned, namely, that of combining two very opposite materials for taking impressions, plaster and composition, in one and the same impression. In many cases of undercut the difficulty could be got rid of by this method. Plaster could be built around a tooth with very much undercut; it would set quickly and then one could take a composition impression on that, and when it was removed from the mouth, by easing away the undercut plaster core and putting it in place, a fairly good model could be got with less difficulty than by a plaster impression. With reference to special trays, although generally used, he did not think they were a necessity. With a decent assortment of trays one could, with a little manipulation, get a fairly good adaptation, at any rate for the first model. He did not even think it necessary to have a tray for the long incisors standing in the lower jaw with the front of the tray cut out. The way to get out of that he had always found was by not putting composition where it was not wanted, but by roughly moulding the composition with the thumb and finger, allowing for the teeth that were standing. In that way they did not invite a failure, and for men in busy practice and working sometimes at great pressure, it was an advantage not to have to make a special tray. There were, however, cases where success could only be got by special trays. With reference to the undercut, he tried plaster of Paris cores some time ago. He had two cases presenting themselves one after the other in the mouths of brothers. In each case the roof was so vaulted and sharp that it seemed like the keel of a boat. He got over the difficulty (having failed with a plaster impression) by simply mixing up some plaster of Paris, building it into the palate, getting it almost to the level of the cervical aspect of the

molars and then taking his composition over that, and a fairly good result followed. He was very glad that Mr. Hern had mentioned a very important point, namely, that of plaster between front teeth, for however nicely they might make the model, there was always a danger of dragging. Then, again, he would suggest that material should not be put where it was not wanted, but by packing either with cotton wool or amadou, a fair representation could be got without the inconvenience of dragging afterwards. With reference to the irrigation tray, although after Mr. Humby's demonstration some time ago, he had felt inclined to try it, the difficulty was that it must take a long time to make those trays, and when the composition was well placed, just flashed over the spirit lamp, and a little cold water drained upon the back of the tray, they could, as a rule, get a very good result without the irrigation tray.

Mr. ROSE, in reply to Mr. Coffin, said that for any case presenting any difficulty he usually made a special tray. Making a special tray did not entail the least amount of discomfort to the patient. As a rule, he used beeswax to take a temporary impression of the mouth, and to that impression made the special tray. He quite agreed with Mr. Hern that in packing spaces in front of the teeth anything which would exclude the composition from going into spaces, or round teeth, or into a cavity where it was not required, was a very great advantage. In reply to Mr. Cunningham, he called attention to the fact that he was discussing purely and simply the merits of taking these impressions in composition. He was not referring to the use of gutta-percha, plaster of Paris, or any other material, not wishing to draw any comparisons. He used composition because it took the least possible amount of time to mould into shape, and by its use he could produce undercuts or duplicate his impression so quickly that two or three could be taken as against one in plaster. He was quite aware that Mr. Coffin had a special liking for gutta-percha and an admirable way of working it. With regard to the spaces between the teeth, it was most important to get the gum perfect and free from distortion. It was very easy to make allowance for an undercut so as to adjust the band, but when the plate rests on the gum it should rest on something that it did not injure, and the patient should be able to articulate fairly with it. With regard to softening the composition, he had only that afternoon tried the experiment of passing a stream of warm water through an irrigated plate

perfectly cold and full of composition, and he found that in less than five minutes the composition could be re-softened so that it might be taken out of the mouth. In practice the composition when pressed into the mouth did not come through from the back of the teeth sufficiently far to make an undercut at the front. Mr. Baldwin had suggested that the same result could be obtained by swabbing the impression tray with cold water, using an ejector for the purpose. There was nothing to prevent that being done, but it was not as nice a method of obtaining the result as with the irrigated tray. With regard to what Mr. Badcock had said of gutta-percha he, Mr. Rose, used composition purely for the reason that it took considerably less time to harden, and gave better results. The same would apply to plaster of Paris. In order to obtain good results it must remain in the mouth nearly five minutes, and if impressions were to be taken in sections, it must be remembered that there was always a slight expansion of the plaster. He could fully bear out Mr. Robbins in his remarks as to ordinary trays. For mouths presenting no difficulties ordinary trays could be used as successfully as special trays. Mr. Cunningham had made him say that he used a tray that should accurately, or nearly accurately fit the mouth. He did not say that at all; what he said was that it should be large enough to admit of a sufficient amount of composition, but not an overflow.

Mr. HOPSON brought forward a case of a lower canine erupting through the lip which had been brought to his notice at Guy's Hospital. Fortunately a fairly accurate account was obtainable from the surgical register of the previous history. The patient was a girl aged $2\frac{1}{2}$, who was admitted into Dorcas Ward on January 19, 1878, for *can-
crum oris*. Twelve days before admission the patient had developed an attack of measles. A week later her mother noticed a black spot inside the left angle of the mouth. This was thought to be an abscess and a poultice was applied. But as the sore rapidly spread the child was brought to the hospital. On admission the cheek was eaten away by phagedænic ulceration, the part affected extending from the left corner of the mouth outwards and downwards, describing an arch about the size of a five-shilling piece. The free borders of the upper and lower lips were included, especially the lower lip. The alveolar border was laid bare and there

was a very foetid smell. Mr. Howse saw the patient and freely applied nitric acid to all the affected tissues. After the sloughs caused by the nitric acid separated, a small portion of phagedænic tissue was seen to be still there, so nitric acid and nitrate of silver were again applied. After this the child seemed so much better that she went out on February 1 with the wound granulating up well. She came again into the hospital four months later with some more ulceration in the old place. This was again treated with nitric acid and nitrate of silver, and some loose teeth extracted. After this a few pieces of necrosed alveolar process came away, but the wound granulated up well, and the patient went out on June 14 with the place practically healed. Subsequently the tissues of the cheek and lips became firmly adherent to the maxilla, greatly limiting the movements of the jaw in mastication. When she was thirteen years of age she erupted a left lower canine, which pierced the lip (which in that condition was adherent to the alveolar process), and this causing great disfigurement. Having apparently tolerated this condition for six years, she came up to the hospital last January and the tooth was removed. She could separate her teeth only to the extent of about a quarter of an inch, but still was able to speak and masticate her food fairly well. Models and photographs of the case were presented.

Mr. A. R. COLYER brought forward a case of incomplete eruption of the first permanent upper molar. It occurred in a patient aged 30. She complained that for three weeks there had been a great deal of swelling on the side of the face, of a painful character. On examination, the left first permanent molar was found impacted, the grinding surface of the crown being on a level with the necks of the other teeth, and slightly tilted forwards, the whole of the crown, with the exception of the grinding surface, being covered with gum. A putrid discharge round the tooth had been noticed for nine months. The other teeth were normal in every respect. On passing the probe round the tooth it went up a considerable distance, and then came to a very hard margin. The tooth was extracted and the pulp found normal, the abrupt margin felt by the probe being the lower limit of a considerable mass of thickened cementum. Two days subsequently a second temporary left molar was removed from the socket. The patient two weeks afterwards went to

America, and on returning home a year later a small piece of necrosed bone was removed.

Mr. STORER BENNETT asked for some further information as to where the second tooth was found in relationship to the first one removed.

Mr. A. R. COLYER said he could not find any relationship at all. He removed the first permanent molar one day and found the temporary molar loose in the socket on the second day. He thought it was a case of unerupted temporary molar preventing the full eruption of the six-year-old molar. He believed the temporary molar was placed between the anterior buccal root and the palatine root of the permanent molar.

Mr. ACKERY said a similar case was presented to the Society two years ago, of an impacted first permanent molar in the lower jaw. At that time he was rather in hopes that some explanation might be offered as to how these first permanent molars could be impacted. In the case referred to, the bicuspid were present and the second molars in position. It occurred in a lad about 12 years old, and he was quite at a loss to explain why the first permanent molar should have been prevented from getting up to a normal length. He should be glad to hear of any suggestions as to the causes that might operate to prevent the full eruption of the first permanent molar.

Mr. HUMBY said it was rather rare to find a first permanent molar retarded in eruption, and still more so to find more than one tooth retarded. They sometimes found a permanent molar down on the level of the gum, as in Mr. Ackery's case and also other temporary teeth not rising to their right level; but in the case mentioned by Mr. Colyer it seemed as if the permanent tooth had come into position and had been succeeded by a temporary tooth, that was to say, that the temporary tooth had attempted to erupt, and had erupted between the roots of the permanent tooth.

The CHAIRMAN said it sometimes happened that a tooth did get caught in that way. It seemed to be a case in which the temporary molar was caught in between the first permanent molar and the second bicuspid, and was held back in some way in the socket until the permanent tooth was removed.

Mr. HUMBY said, with reference to depressed molars, it was sometimes very difficult to decide whether a tooth, such as the first permanent molar, really had ever been of full length and

afterwards retreated into the socket, or whether the tooth had risen up to a certain distance and then refused to rise any higher. He had a very curious case, where great pain was referred to a depressed lower molar of that kind; the tooth was subsequently extracted, but although it had been the seat of very great pain it was apparently perfectly free from caries. It was a case on all fours with that mentioned by Mr. Colyer, excepting that there was no temporary tooth.

Mr. MAGGS said it appeared to him as if the position of the temporary tooth was where Mr. Colyer had stated, namely, between the anterior buccal and palatine roots. Was the crown at the level of the gum margin or somewhere between that and the occluding surface of the permanent molar?

Mr. A. R. COLYER said the grinding surface of the molar was on the level of the necks of the other teeth, being slightly tilted forward.

Mr. STORER BENNETT said he wished to draw attention to a case of prolonged and intense pain after the extraction of a tooth due to an irritated nerve being exposed at the apex of the socket, which resisted all treatment until it was incised. On November 15 last he was consulted by a lady, aged 23, who was suffering from serious periostitis in her left upper wisdom tooth, the only remaining molar on that side of the jaw. A few days previously she had undergone an operation on the right side of her mouth, which was immediately followed by pain in the left upper wisdom tooth, with inability to insert a plate which she had worn up to that time. The operation has been performed under an anæsthetic, and the mouth kept open by a Wood's gag inserted on the left side, but which had been so unfortunately used as to dislocate the wisdom tooth on which it rested. He (Mr. Bennett) wished to venture on a word of warning in the use of this powerful instrument, which he had known to occasion serious pain in many instances, with causing which the dentist had been credited rather than the anæsthetist, who had been the real offender. Feeling that it was hopeless to restore the dislocated tooth to its former position, he decided to extract it, and the tooth was removed without difficulty. The socket, however, was intensely painful, and remained so during the next twelve days, during which repeated applications of strong carbolic acid, tincture of aconite, and strong solutions

of cocaine were applied to it without relief, and hot poppy fomentations held in the mouth were equally useless. In the meanwhile the socket granulated healthily, except at its apex, where he detected, by the aid of a mirror and probe, a spot about the size of a pin's head, which looked white in colour, in marked contrast to the red of its surroundings, and caused the greatest agony on being touched, no matter how lightly. Bearing in mind that John Hilton in his lectures at the Royal College of Surgeons in 1860 described "some instances of ulcers and wounds which were very painful in consequence of the exposure of the ends of nerves in the wounds, cases in which the pain was stopped by the division of the nerve just below the surface of the wound," it occurred to him that this was a case of a similar nature, and that would yield to similar treatment. He therefore passed the blade of a Paget's knife into the socket for about a quarter of an inch and cut across the nerve with the happiest result, for the pain instantly ceased, never to return.

The thanks of the Society having been given to the authors of Casual Communications, the meeting adjourned.

STUDENTS' SOCIETY, NATIONAL DENTAL HOSPITAL.

The usual Monthly meeting of this Society was held on Friday, March the 8th, the President, Alfred Smith, Esq. in the Chair. A large number of visitors brought the attendance up to about 130, and they received the usual welcome from the President.

Messrs. Francis and Vernon having been proposed for membership at the last meeting were ballotted for and duly elected members of the Society.

The PRESIDENT then called for Casual Communications.

Mr. SPOKES showed a model of the upper jaw of a girl aged 11 years. When coming under observation, the patient had the right upper temporary lateral retained, whilst the corresponding permanent tooth had erupted and was locked within the bite by the lower teeth. The case seemed a suitable one

for "immediate" regulation, so the temporary tooth was removed and the permanent one forcibly but gradually brought forward in front of the lower teeth where it was supported in its new position by interlacing fine silver wire round the neighbouring teeth. It was not the first time he had resorted to this method and previous experience had shown that in such a case there was no pain or after disturbance, whilst the avoidance of a plate to raise the bite, required in the usual treatment, was a considerable advantage to both patient and practitioner.

Alluding to the difficulty of photographing the interior of the mouth, the speaker showed an attempt to demonstrate the existence of a well-marked buccal fold of mucous membrane in a boy. It was not unusual to find a frænum in other parts of the mouth than the well-known positions, and in examining a large number of children's mouths he had found, in perhaps 1 per cent. that a distinct frænum extended from the bicuspid region outwards to the cheek. If the child is made to close the teeth and a finger pulls back the angle of the mouth, there is seen a condition which is strongly suggestive of a buccal pouch, such as is normally present in certain Monkeys. Whether such a frænum might be regarded as a vestigial fold which gradually disappeared, he could not of course undertake to say.

Mr. BLAND SUTTON said that when Mr. Spokes mentioned the matter to him some two years ago, he thought it of great interest. It seemed that such a fold was in the corresponding position to the cheek-pouches of Monkeys. He stated that the Gibbons, although generally placed below the other Anthropoids, yet showed in some most interesting particulars a closer resemblance to man.

The PRESIDENT then called upon Mr. Bland Sutton to speak upon "Tumours of the Jaw." The address was delivered extempore, and illustrated by museum specimens. An abstract is published at page 337.

Mr. ROUGHTON said, Mr. Bland Sutton's remarks are always of the greatest interest, and more especially so when they treat of tumours of the jaw. He was glad to notice that Mr. Bland Sutton is disposed to separate myeloid tumours from the class of sarcomata. His own observations have led him to agree with him in this respect. About ten years ago he had the opportunity of observing a case of blood cyst of the upper end of the tibia in which permanent recovery followed upon simple incision and evacuation of the contents. The

wall of the cyst, which was composed of thinned or expanded bone, showed myeloid cells when examined under the microscope. A few years ago he removed a myeloid epulis from the lower jaw. When he examined it microscopically he was able to trace the formation of capillary blood vessels from the myeloid cells of which it was very largely composed. The appearances they presented were almost identical with those which are seen in developing blood vessels in the embryo. It would almost appear that myeloid tumours are in reality tumours of embryonic blood vessels.

He had recently operated on an unusually large follicular odontome; the cyst expanded the mandible from angle to angle. It contained the left permanent lateral incisor. To the neck of the tooth was attached a little solid flask shaped mass, which strongly suggested the rudiment of a third dentition; unfortunately microscopical examination, owing to imperfection of the specimen, failed to throw any light upon its nature.

Mr. SPOKES, alluding to Mr. Sutton's statement as to rickets being a cause of fibrous odontomes, expressed surprise that the former should be so frequent and the latter so rare. He also drew attention to the lecturer's remarks as to the importance of the dental surgeon differentiating between myeloid and fibrous epulides.

Mr. BLAND SUTTON in replying, referred to a dentigerous cyst which was to be seen in the museum of St. George's Hospital, supposed to be the largest in existence. This cyst is about as large as an *Emu's* egg.

The PRESIDENT called upon the meeting for a vote of thanks to Mr. Sutton for his admirable address, and, this having been accorded by acclamation, the meeting adjourned.

MANCHESTER ODONTOLOGICAL SOCIETY.

The ordinary monthly meeting was held at the Victoria Dental Hospital, Devonshire Street, on February 5th, 1895. The President, William Dougan, Esq., in the chair.

Demonstration on Gold Stopping with Hand Pressure, by Mr. L. Matheson, L.D.S. Eng.

Mr. MATHESON inserted a gold filling into a palato-mesial cavity of a right upper central incisor, working almost entirely with the mirrors, and operating from the palatal aspect. One strip of gold and tin tape was used at the cervical edge, care being taken that it should not reach the labial wall. Two-thirds of the cavity were then filled with Wolrab's cylinders, used *non-cohesively*, and the remaining third with the same gold used *cohesively*, along with tape of 32 thickness. Hand-pressure was employed throughout the whole of the operation, the pluggers used being very finely serrated, and of a special pattern. A modification of Fernald's wire frame was used for maintaining the rubber dam in position. Mr. Matheson strongly advocated its use in preference to any retractor.

Demonstration on Mineral Restoration, by Mr. Peter Headridge, L.D.S.I.

The patient, a boy, aged 12, had left central incisor badly decayed on facial surface.

This surface was ground down until the decayed portion was removed, and the face of the tooth made quite flat to just above the margin of the gum. One of White's pin teeth was selected to match the natural ones in shade and character. The back of this was ground down to the thickness required to fit the natural tooth.

A slot was then cut in the mineral from right to left, into which was fused a piece of platinum wire, bent at the ends to a right angle.

A hole was then drilled on each side of the pulp cavity of the natural tooth to receive the ends of this wire. The fine finishing was completed by cementing with Poulson's stopping.

GLASGOW DENTAL STUDENTS' SOCIETY.

At a meeting held on the 20th February, Mr. Rees Price gave a lantern exhibition of microscopical sections. A few on Odontomes, by Mr. John J. Andrews, of Belfast, were also shown. On the 28th February, Mr. William Dall gave a lantern demonstration on "Porcelain Inlays, Ancient and Modern."

At the meeting on March 6th, Mr. John Angus read a paper on "Vulcanite Work," which was followed by an interesting discussion. Before the paper was read Mr. Grant, secretary, announced that there was a surplus of £9 10 6, from the D. S. Concert, which was held in the St. Andrews Halls, on Friday, 25th January. It was agreed that part of the money be spent in purchasing books for the library.

Dental News.

THE DENTAL HOSPITAL OF LONDON.

The 37th Annual Meeting of this Institution was held at the Hospital on March 13th, Mr. Henry Harben, J.P., a Vice-President, in the chair. The report was unanimously adopted. The Committee of Management congratulated the Governors on the continued usefulness and prosperity of the Charity, but regretted the fact that the largest proportion of the donations still emanated from the members of the Dental profession instead of from the public. The great benefit which the Hospital continues to afford to the suffering poor is manifested by 58,499 cases having been treated during the year 1894, being 3,174 in excess of those of the previous year, and 39,240 in excess of the number treated in 1874, in which year the Hospital was moved from Soho Square to its present site. It has been found absolutely necessary, in consequence of the increased number of patients, the crowded state of the waiting rooms, the absence of passage room, and the insanitary, inadequate, and badly-fitted condition of the present building, and back premises being unattainable, to build a new Hospital. A special appeal has been issued for the necessary funds, and the Committee have the pleasure to acknowledge £11,223 16s. 4d. The value of the present site is estimated at £15,000 to £20,000 (but this sum cannot be realised until the new building is erected), making together about £26,000 and as it has been estimated that the cost of the site and the new Hospital will be about £40,000 there remains a balance of £14,000 to be collected, which sum the Committee have no

hesitation in asking the public to speedily contribute. The new site is purchased, and the houses upon it are let at such rentals as pay the interest on the money advanced by the Bank. Dentistry is one of the few specialties of the Healing Art that is justified in possessing a special Hospital; the Committee of Management therefore have no hesitation in making very urgent appeals—firstly, for the funds necessary to erect the new Hospital, and secondly, for an increased number of annual subscribers to enable the Charity to continue its usefulness to the poor, and to meet the cost of maintenance, the Hospital being absolutely free from any endowment, and relying entirely upon the free will offerings of the charitable public to be enabled to carry on its useful work.

THE EDINBURGH DENTAL STUDENTS' SOCIETY.

The tenth Annual Meeting of this Society was held on the evening of March 4th, when Mr. T. B. D. Walkinshaw read a paper entitled "The position of L.D.S. v. The unqualified Practitioner," and Mr. Sewill Simmons, L.D.S., the retiring President, delivered his Valedictory Address. Mr. Walkinshaw had prepared an excellent paper, and his arguments against quackery were well illustrated by Mr. Blandy's collection of dental advertisements. A most animated discussion followed, the majority being in favour of early action being taken in the suppression of the charlatan.

On the following Friday evening, the Annual Dinner was held in the Imperial Hotel, seventy gentlemen being present. Mr. W. Bowman Macleod, the Dean, in the unavoidable absence of Dr. Macdonald Brown, the Hon. President, through illness, occupied the chair, and the principal guests were:—the lecturer on Dental Anatomy, the lecturer on Dental Surgery, Dr. Craig, Dr. Miles, and Mr. Oswald Fergus, L.D.S. Glasgow. The following toasts were proposed and duly responded to:—"Loyal." "The Edinburgh Dental Students' Society," proposed by Mr. Macleod, and replied to by Mr. J. Malcolm, L.D.S., the President elect; "The Incorporated Edinburgh Dental Hospital and School," by Mr. Oswald Fergus, L.D.S., reply by the Dean and Mr. G. W. Watson, L.D.S.; "The Edinburgh Medical Schools,"

by Mr. J. S. Amore, L.D.S., reply by Dr. Miles; "The Guests," by Mr. T. R. D. Walkinshaw, responded to by Dr. Proudfoot, and the "Chairman," by Mr. Charles Wood.

An excellent programme of songs, recitations, and instrumental solos had been arranged by Messrs. Carr and Morris Stewart, the guests vieing with the many talented students in their efforts to entertain the company. Of the students Messrs. Bell, Carr, Shennan, Lightfoot, Nash, Markham, Routledge, and Morris Stewart, with Messrs. Macleod, Andrew Wilson, and David Munroe, L.D.S., did much to entertain, and their efforts were heartily appreciated.

As usual the illustrated menu by Mr. Fred Page, L.D.S., was one of the features of the evening. Entitled "The New Woman—forward, but not too fast," in many cartoons the lady dentist was portrayed in a good natured manner as a student, and as a practitioner. The back page was devoted to a picture representing two ladies dilating on the suitability to the individual case, of chloroform and of gas, whilst the morbid looking patient soliloquizes, "How happy could I be with e(i)ther, were t'other dear charmer away."

APPOINTMENT.

R. Ernest Wood, L.D.S. Eng., to be Honorary Dental Surgeon to the Cottage Hospital, Harrogate, Yorks.

Dental Hospital Reports.

WORK DONE at the Victoria Dental Hospital of Manchester, during the month of March, 1895.

Number of Patients attended	923
Number of Extractions	659
Number of Extractions under Anæsthetics	187
Gold Stoppings	55
Other Stoppings	100
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	269
Crowns	5
Irregularities	27
Total	1302

JAMES A. LEES, *House Dental Surgeon.*

British Journal of Dental Science.

No. 655. LONDON, MAY 1, 1895. VOL. XXXVIII.

CARIES. ITS EFFECT, AND THE TREATMENT OF ADVANCED CARIES.*

By Mr. THOMAS C. REECE.

Mr. President and Gentlemen,—It is needless for me to say much as to the importance of this subject, inasmuch as it has often held a very prominent place at many dental gatherings and discussions. To those who have not troubled to look into the earliest history of our profession, dentistry may appear to them as an outgrowth of yesterday, and with truth this might be said of its truly scientific aspect. Still tooth healing and treatment is very old in this world, for almost at the dawn of historic times we find that the ancients did not overlook this branch of the healing art, and such famous men as Hippocrates, Aristotle, Pliny, Martial, Galen, and Celsus, have spoken about the teeth, and some of the generalizations of these ancient writers are very good. Aristotle says that they are the only bones that grow throughout life, and that if they were not constantly renewed they would soon be worn down by attrition. Whatever Aristotle deduces from this, it is at all events suggestive and intelligent. Hippocrates and Galen, who wrote the Medico-Dental text books of their day, have in their writings receipts for electuaries and powders for beautifying and preserving the teeth.

* Read before the Students' Society, National Dental Hospital.

The significance and importance of these pearly structures among the ancients might well be gathered from an ancient Egyptian law which made extracting a front tooth as one of their most infamous and severe punishments. There is no doubt but that whenever this tooth was lost either through crime, or disease, no effort would be spared in order to save or restore it, as otherwise it would give rise to uncomfortable suspicions. Martial makes continual allusions to artificial teeth being worn by the ladies of Rome in his time. Artificial teeth have according to Belzoni been discovered in the Sarcophagi of the Egyptians, and in the excavations of Pompei and Herculaneum various dental instruments have been found, very similar to those we use in the present day, which goes to show that the teeth were not only extracted, and replaced, but that measures were taken to save them from the ravages of caries.

During the period that is termed the middle or dark ages, Dentistry, like everything else that was good for the race, underwent a term of long banishment from the earth, that is, it lost the lustre it had in the days of Greece and Rome. It was not entirely dead, for a glimmer of its past rays shone here and there. In the early part of the eleventh century, Albucasis, an Arabian physician, wrote a treatise on diseases of the teeth, and gave drawings of instruments for extracting, scraping, and various other dental operations.

In more recent times, the first attempt to classify dental diseases was made by M. Fouchard, of Paris. This Treatise was soon followed by the writings of Bunon, Mouton, Bourdet, and the celebrated Jourdain. In 1770 Thomas Berdmore's work appeared, which got him the appointment of dentist to George III. A few years later appeared the works of Hunter, and in 1798 that of Blake.

During the first half of this century the writers on dental subjects are fairly numerous, among them may be mentioned

the names of Fox, Bell, Nasmyth, Goodsir, Owen, Robertson, Robinson, Snell, Waite, Jobson, and Saunders. As contemporaries in America, we have the names of Parmly Brown, Goddard, Garditti, Harris, and other writers, great and small.

All these different writers have registered their opinions on the subject we have to consider to-night, viz., on Caries of the Human Teeth, and diversity of opinions amongst these earlier authors are almost as numerous as the authors themselves, which is well verified by the following few instances.

Hunter sums up by saying, "We may therefore reasonably suppose that it is a disease arising originally in the tooth itself."

Gerbeaux said, "that it originated in many individuals in organic disposition, and was transmitted from father to son."

Fox said, "that the proximate cause of caries appears to be an inflammation of the bone of the tooth itself, which on account of its peculiar structure terminates in mortification."

Hertz ascribed the cause to heat in the form of hot food, and inflammatory fevers, which may induce increased vascularity of the gums.

Bew ascribed it to lateral pressure of the teeth against each other.

Parmly, an American, was the first to suggest something approaching the chemical theory. He ascribed the cause to want of cleanliness, and the action of corrosive substances thus formed.

Bell denominated caries Dental gangrene, and ascribed the principal cause as due to inflammation.

Saunders, in 1837, said that caries was due to two distinct sets of causes, which he termed constitutional or predisposing, and the other developing or exciting causes. Under the former he included all those of hereditary predisposition, and that of the latter consisted in subjecting the teeth to

violent and unnatural action and uses, such as cracking nuts, and biting hard substances, etc.

Harris, in 1845, said if decay of the teeth is not referable to inflammation in their bony structure, to what is it to be ascribed? Further on he endeavours to show that chemical agents play no mean part in the role, in the form of putrescent particles of vegetables between the teeth, and in short anything that is productive of irritation of the dental membrane or gums.

Robinson, Robertson, and Waite, seem to favour the chemical theory, with somewhat varying conceptions as to the methods of its operation.

Such were the ideas respecting caries of teeth up to the end of the first half of this century, some believing in the vital theory, a process of inflammation of the pulp and solid portion of the tooth, and involving its destruction from within. Others holding, as we have seen, that chemical agencies were mainly responsible for these degenerative changes in the tooth substance.

During the latter half of this century the older views respecting caries have undergone a considerable transformation, and among those who have contributed to bring about this change, may be mentioned such names as those of Tomes, Magitot, Wedl, Coleman, Leber, and Rottenstein, Underwood and Milles, Bödecker and Miller, Klein, Waldeyer, Neuman, and many others.

Amongst the first of these is Sir John Tomes, who brought out his *Dental Surgery* in 1859. In this and subsequent editions he endeavours to show that caries is wholly due to chemical action, and that what he terms the vital theory of the older writers, plays no part in bringing about the decay of the teeth, and certainly it must be confessed that both his argument in favour of the chemical theory, and his onslaught on what he terms the so-called vital theory, are very telling.

Some of Mr. Tomes' arguments in favour of the Chemical Theory are the following:—

Take for instance two bicuspid, one is quite healthy, and the other on its adjoining surface has the dentine exposed, but in no way decayed, in fact it may have a polished surface. Now if you place a plug of cotton wool between the necks of such bicuspid, and leave it so for a day or two, (when it might be changed and a fresh supply inserted), upon examination we shall find that the exposed denture is much softer, and at the expiration of a fortnight or three weeks the former undecayed dentine is simply a mass of caries. More than this, the enamel of the sound tooth is found dissolved, and caries making its inroads there as well. Now Mr. Tomes argues that the cotton wool acts as a media which serves as a suspender of various acids generated in the mouth, which brings them into a close and continued apposition to the necks of the teeth, since he finds that if the wool is previously immersed in mastic solution no such change takes place, because in this case the mastic shuts off the possibility of the wool becoming impregnated with the oral fluids. Although this is a simple method, I think it conclusively proves his case, and it is moreover found that the fluid thus accumulated is distinctly acid in reaction.

Respecting the so-called vital theory, Mr. Tomes' answer is by no means less to the point, for he says it is hardly conceivable that there should exist, in the same mouth, two different causes, the one belonging to the dead tooth being chemical, and that belonging to the living tooth being due to vital action, since both present a decay that are to all appearances identical. Mr. Tomes says that this question has never been fairly answered by those who support the vital theory. Again he makes his argument even more convincing when he says that we are able to scrape away the decay of a tooth and fill it, thus completely arresting the

progress of decay for years or perhaps through the whole period of a patient's long life. If, as the holders of the vital theory would have it, that the source of the mischief proceeds from the pulp, or from within, it is not at all feasible that stopping a tooth would have any effect in arresting the progress of decay.

Putting aside for the moment these arguments of Mr. Tomes, I think that a consideration of the nature of the gases of the mouth will strongly favour corrosive action as being the cause of caries. In the mouth there are always present certain chlorides; these being decomposed would liberate free chlorine, this again combining with the hydrogen of the buccal cavity forming hydrochloric acid, which has a strong action on both enamel and dentine. Besides this, hydrochloric acid is a constituent of the gastric juice, and if present in abnormal quantities, as in the case of acid eructations from the stomach, it would have a very permanent effect on the teeth. Again, we know that oxygen and nitrogen are always present, and the ultimate product they would form would be nitric acid, which is even a more deleterious acid.

There are always present in the mouth certain albuminoids, and always in combination or association we have sulphur; this in turn would become H_2S , which in the next place would be decomposed into sulphuric anhydride and water, the nascent SO_3 combining with H_2O would form sulphuric acid, which would naturally have a very injurious effect on the dental tissues. Some observers make this agent accountable for the black decay we find in teeth from its effect in charring organic material.

Then we have a certain amount of lactic acid fermentation going on, and lactic acid above all acids is found to have a very destructive influence on the teeth.

From experiments directed to find the relative destructive action of both vegetable and mineral acids, it is found they

have a selective action. For instance, certain acids are found to have little or no action on enamel, but have a very destructive action on dentine ; such is the case with acid tartrates, tartaric and acetic acids. Others again are found to act powerfully on enamel but not on dentine, as in the case of acid oxalates, oxalic and alum.

Again we find other acids and solutions to have powerful action on both enamel and dentine, as is the case with citric, malic, carbonic, and the products derived from sugar and albumen. Although the source of acids in the mouth is almost illimitable, still it is not the only factor in the production of caries, for it does not account for all the phenomena presented by caries.

Mr. Tomes, after investigating all the latest theories, seems to endeavour to maintain that it does, for on page 280 he sums up by saying that "caries is an effect of external causes in which the so-called vital forces play no part." "That it is due to the solvent action of acids which have been generated by fermentation going on in the mouth, organisms having no small share in the matter, and when once the disintegrating process is established at some congenitally defective point, the accumulation of food and secretions in the cavity will intensify the mischief by furnishing fresh supplies of acid."

In a former edition it was stated that buccal mucus was accountable for all the acid forming products, but the last edition conceded that organisms contribute not a little towards the formation of acids. Certainly this is a change of position in the discussion, but at the same time it does not seem to admit or give the fullest credit due to the latest investigations on the subject, for, as we shall presently see, there is something more than plausible in the theory that organisms play no mean part in the process of decay. Of course the view is not to be confounded with the older vital theory that

made out that caries of the teeth is analogous to inflammation of bone, proceeding from within. This is really a more elaborate and comprehensive application of the Chemical Theory, for according to this the first inroads are made by chemical agencies in the form of acids, whether taken directly or generated by fermentation or brought about by chemical decomposition ; it is after this inroad of acids that organisms begin to play their part.

As far back as 1862, Mr. Coleman submitted teeth to the temperature obtained in the mouth, and to similar agencies, including salivary mucus ; by this experiment he found that caries could be artificially produced.

In 1867, Magitot made similar experiments, but he also experimented excluding septic material, that is by means of acids only. He found that the enamel was readily eaten away, but not so the dentine, and moreover that the sheaths of Neuman did not present the varicosities of natural caries in the mouth ; neither was there observable the pigmentation of ordinary caries. At the time of the experiments he could not account for these discrepancies.

A little later, MM. Leber and Rottenstein made like experiments, but under the conditions obtained in the mouth, and discovered a microbe occupying the tube to which they gave the name of "*Leptothrix Buccalis*;" this they described as penetrating far into the tubes and enlarging them.

Some twelve years after these experiments of Leben and Rottenstein, Messrs. Underwood and Milles presented their researches on this question before the International Medical Congress of 1881, when they showed a considerable advance upon what was known on this subject before. From their investigations they demonstrated that the sheaths of Neuman were not only tenanted by the *Leptothrix Buccalis* but also by much smaller bacteria in the forms of micrococci, such as the *Streptococci*, *Staphylococci*, and *Diplococci*. Some of

these they found penetrated far into the dentine, occupying the field a long way in advance of the general body after the fashion of the sentinels of an army. They unravelled the difficulties that confronted Magitot in 1867, viz., as to the causes of pigmentation and the enlargement of the tubes that is always observable in Dental Caries ; they went further and found that the decay of hippopotamus ivory worn in the mouth was precisely the same as that observable in living teeth. They also found that when teeth were exposed to the action of weak acids and aseptic solutions, dissolution went on as long as the acid remained unexhausted, but when teeth were submitted to similar conditions to those met in the oral cavity where fermentation produces an unending supply of corrosive material, decalcification was complete, and all the organic basis of dentine was destroyed. They discovered by cultivation that different organisms produced the characteristic pigmentation of caries, and that certain microbes were capable of effecting specific colourations, some brown, some green, some black. All the experiments to produce caries by means of corrosive agencies in aseptic solutions failed singularly on two points, viz., that there never was an enlargement of the tubuli, and never the pigmentation observed in caries produced in the mouth.

The next to follow in the same lines as Messrs. Underwood and Milles was Professor Miller of Berlin. Dr. Miller first traced the acid which is the prime agent in caries ; he demonstrated that there is in the mouth an acid-forming ferment of organic origin ; he obtained pure cultures of the organisms, and found that when added to a fermentable mixture they gave rise to the formation of acids capable of decalcifying both enamel and dentine. He attached to the teeth within the mouth tubes containing sterilized starch solution ; with access of saliva these were left in contact for six or eight hours, when the sterilized starch was found

to be distinctly acid. By submitting teeth to the action of saliva and bread at a temperature varying from 94° to 98° F. (changing the mixture whenever it became putrid) he produced caries that could not be distinguished either macroscopically or microscopically from the true variety.

Thus from our survey of the principal writers on this question (ignoring the Electrical theory of Bridgeman) we are confronted with four great views, viz. :—the Chemical of Tomes, the Chemico-Parasitic of Miller and others, the Septic of Underwood and Milles, and the Inflammatory theory of Bödecker and Heitzman. The evidence on the whole is in favour of the combined Septic and Chemical theories. Whether the acid is all produced by germs is a question equally difficult either to prove or disprove but we have already seen that so far as our chemical knowledge of the constituents of the mouth goes, it decidedly militates against the views entertained by the septists. Underwood and Milles, who are the principal exponents of this view, are seemingly wrong in the interpretation of this portion of their theory. Still we are not to a small extent indebted to them for their investigations on this subject which they set in a clearer light than had hitherto been done. The Chemical theory, as we have seen, completely fails to account for all the appearances produced by caries. Whereas the inflammatory theory of such early writers as Hunter, Fox, and Bell, and still upheld by Bödecker, Hertz, Heitzman, Neuman, and Abbott, seems to be maintained in the face of very powerful arguments to the contrary, and unless there is to be brought forward in its favour far more cogent reasons than have been hitherto advanced, it might truly be said that its anchorage is cast on the quicksands of imaginative belief rather than on the rock of experimental demonstration and fact.

Caries having once established itself, certain changes in the

affected tissues are not long in manifesting themselves. The enamel becomes decidedly porous, and decay may appear as a black speck or streak in a fissure, and sometimes as a white or opaque mark on the surface, which changes from a slatish to a brownish colour; such an enamel looks under the microscope like one that is not fully calcified, or that of enamel partly decalcified with chromic acid. The axial portion is first affected, the prisms being held together by thread-like prolongations, and enamel of this kind has a characteristic pigmentation which, be it remembered, is never produced when the caries is brought about by the agency of acids.

The dentine also presents characteristic histological changes. It becomes softer and darker in colour; this state of things might be accompanied with pain or there may be none. The nature of the pain is not the same as that of an exposed pulp, it is a good deal less severe, and not so much altered in character after taking hot or cold liquids, but is generally affected with either acids or sweets. The tooth externally may only present a minutely darkened fissure, which if opened will reveal the presence of a cavity which proceeds along in the direction of the tubes and is generally conical in shape, the base of the cone being directed towards the faulty fissure in the enamel. If a thin section of such carious dentine be examined under the microscope, it presents characteristics familiar to you all. We shall see the dentinal tubes swollen to many times their ordinary diameters, a transverse section presenting the tobacco pipe appearance of the tubes, the sheath of each tube being much swollen, and bringing again to view the rod-like cells of the dentine previous to calcification. At this period of the decay the dentine may be said to be broken up into its embryonic or histological elements. If we closely look into a section of this kind of dentine, and examine it from its sound end to its periphery,

the rods seem to increase in size almost up to the peripheral end, and quite at the periphery there is only to be observed a granular débris which is being constantly washed away with the saliva. The progress of decay is always much slower in the sheath than in the intertubular substance.

If a tooth attacked with caries be divided in the long axis, we shall not only see in a section of such tooth a dark portion due to the chemical change effected by caries, but we shall find in advance of this dark area, or between it and the pulp there is to be seen a zone of transparency which is familiar to you all as the transparent zone of Tomes. This is not altogether indicative of caries, for it is found in the roots of elderly people's teeth, in sound stumps, and can be made much more prominent by artificial means. Lastly, it is found in human teeth worn in the mouth on artificial plates. This zone was at one time thought to be indicative of vital action which brought about calcification and obliteration of the tubes, but since Wedl and others have discovered it in the last named situation, such an idea as to its vital origin can no longer be entertained. Since it is found that any cause that will equalise the degree of calcification of tube and matrix will also increase the transparency, the opacity of healthy dentine is inferred to be due to a difference in the refractive index of the air contained in the tubes and the intertubular basis of dentine.

There is another form of caries which attacks "honey-combed" and other teeth; this has received the name of Arrested Decay, from the fact that it may remain stationary for many years or even throughout life without causing the patient either pain or discomfort. Arrested Caries has been known to take place in the teeth of people who have made climatic changes or changed their habit of living, which I think goes a long way to show that it is largely dependent on constitutional changes.

Whenever decay approaches the pulp the lining layer of odontoblasts generally makes a considerable effort to place a barrier, in the form of secondary dentine, between the affected tissue and the pulp, but when once the latter is exposed, or even before, it may give rise to a host of diseases, such as acute and chronic inflammation, hypertrophy, atrophy, hyperæmia, and consequent congestion leading to periodontitis, alveolar abscess, and many other diseases of the tooth pulp, which are beyond the scope of this paper to deal with, excepting so far as they may be referred to in the Treatment of Advanced Caries.

The treatment of caries, at any stage is of the utmost importance, and if people could be educated to value the advantage of having it attended to in its earlier stage, they would undoubtedly be richly recompensed, and a discussion of the treatment of advanced caries would be almost unnecessary. Unfortunately such is not the case, and it might fairly be said that about four-fifths of the teeth presented to us for treatment in one form or another, are the subjects of deep-seated caries. I believe that in this direction great progress is still to be made, more especially perhaps in saving the pulps of teeth than in divitalizing and treating root canals. It is self-evident that it is of paramount importance this should be thoroughly and effectively done, more particularly in the case of crowns, pivots, or bridgework, for an after failure in the operations would be far more disastrous than in ordinary fillings.

When we look back to the dental literature of the first half of this century, we find no scientific treatment of exposed pulps and pulpless teeth in the records and writings of the practitioners of those days. This department of dentistry is of comparatively recent growth, the result being that a multitude of teeth that would be then sacrificed are now saved.

The treatment of this form of caries is based on a more

intimate acquaintance and accurate knowledge of the histological, physiological and anatomical constitution of the teeth, from which we learn that the life of the tooth is not wholly dependant on the pulp, for it is found that the lacunæ and canaliculi of the cementum are not only in touch with the pericementum, but that through the granular layer they communicate with the branching tubuli of the dentine, and that both the intertubular portion of dentine, and the intercanalicular portion of cementum are permeated by fibrillæ of living plasm, which enables the pulpless tooth to survive the destruction of its pulp. Notwithstanding that a tooth can be thus saved, still in the treatment of advanced caries it is desirable whenever possible to save the pulp. This is effected in cases where it is covered with dentine more or less decayed, by first applying the rubber-dam, wherever practicable, then swabbing the cavity with warm water, dry with a hot air syringe, thoroughly soak the affected part with one of the antiseptic essential oils or creosote, again well use the hot air syringe, and with a sharpened spoon excavator scrape away as much as possible of the affected tissue leaving a thin layer just over the pulp and seal this with an extra plastic oxyphosphate introduced in such a way as not to enclose air. Some advocate placing a cap of metal or other material either beneath or between two layers of the phosphate, but I think that little is gained by such a procedure, and it may materially enhance the admission of air.

In teeth where we have rupture of the sac, congestion, or inflammation of the pulp, it is generally safer to devitalize than to conserve, as most of the efforts made in this direction have not so far proved successful. Notwithstanding the many palliative and even nutritive remedies that have been employed, nearly all of them are found to have little or no remedial effect. This might arise from the fact that the object we have in view when saving a normal pulp is defeated

through the want of sufficient activity on the part of the odontoblasts to form a protective layer of secondary dentine. When such teeth consist of incisors and canines, it is better to destroy the pulp whilst the patient is under nitrous oxide gas, but in any other part of the mouth perhaps an arsenical dressing is preferable on account of the difficulty of getting immediate access to the root canals. The strength I have found useful is Arsenic, Cocaine, and Morphia, of each one part made into a paste with either creosote or vaseline. Some contend that Creosote should not be used on account of its liability to coagulate the contents of the dentinal tubuli, and therefore they advocate a mineral fat such as vaseline, or wool fat such as lanoline. Arsenic being such a powerful poison, there cannot be too much care taken in applying it, and I have known that where the dressing has been left in for a long time periostitis supervened, the tooth becoming loose. Whether this was due to the Arsenic or not I cannot say, but it did not look unlike it. When we remember the connection between dentine and cementum, it does not seem improbable that under certain circumstances it may affect the root membrane. In using Arsenic one not unfrequently finds that the apical portion of the pulp is not destroyed, in which case a little nitric acid on an unbarbed broach will generally accomplish the desired end.

In our treatment of advanced caries, we not unfrequently find that the chamber is quite tenantless of live pulp; then generally one of the following conditions prevail :—

1st.—The pulp has either atrophied or calcified, or it might have been quite recently extirpated from the canal.

2nd.—It might be putrid, which putrescence might affect the dentine only, or both dentine and root membrane, terminating in alveolar abscess.

In treating the first form we must carefully exclude saliva,

and maintain the aseptic condition of the canals and quickly fill them.

In our treatment of the second forms the root canals must be thoroughly opened up, remembering the deviation from the normal state we may find in the division of the roots of bicuspid and molars, at the same time not neglecting the treatment of any incidental affection of the root membrane, the canals should be carefully washed out with warm water or alcohol and peroxide of hydrogen. Sterilize with heat, perchloride of mercury, and essential oils.

In the next place we will take it for granted that we have almost ready for filling the root canals of teeth, whose life we have deprived by arsenification, and those we have just alluded to as being tenantless of pulp. The final treatment for these two cases will naturally have been the same, that is to fill the root canals. I believe the usual method is to swab the canals with alcohol, ream them with Gates' drill, wash with perchloride of mercury and dry, then plug the the apical foramen, and either fill the root canals with antiseptic wool, G. P., iodol wax, gold, or oxyphosphate. On paper this seems to be simplicity itself, but in practice I have always found it to be otherwise. To get antiseptic wool, G.P., or iodol wax up any distance is a very difficult task, in fact, in the roots of many molars and bicuspid it is almost an impossible feat. Gold and oxyphosphate are by no means easily introduced, and if any after mischief should occur it is equally difficult to remove them.

I have of late adopted another plan, which consists in enlarging the canals, mummifying the dentine with oil of cloves, and then drying with a hot air syringe almost to scorching. This can be more effectively done by means of a silver broach attached to a copper or silver bulb, (the whole thing can be had at any of the depots). The bulb is heated to redness, and the great conductivity of the fine

silver broach enables one to convey considerable heat to the minutest ramifications of the root, and instead of using G.P., antiseptic wool, iodol wax, gold, or oxyphosphate, etc., I use a preparation that is antiseptic, tough, and possessing some elasticity which under pressure is capable of being made to penetrate the minutest root canals. This is composed of three parts of resin, one part pharmacopœal resin ointment mixed with two parts of Lycopodium and a sufficient amount of Hydrarg. Perchloride to make it 1 in 1000. A little of this is taken at the end of a small spoon excavator, or small plugger, and pressed into the root canal where it is left. The advantage this possesses over those I have named is that it is in the first place antiseptic, it is more easily introduced, it is equally easily removed, and it has not given rise to any unfavourable symptoms in the teeth where it has been for a considerable time. Whenever the patient exhibits the slightest twitching during its penetration of the root canal, you may rest assured that it is nearing the apical foramen, as there is always experienced a certain amount of pain before this part of the tooth is reached.

OPERATION FOR HARE-LIP.—Dr. A. Broca, dealing with this subject in *Revue Mensuelle de Stomatologie* speaks strongly in favour of not admitting the patients into hospital. His statistics show that of six cases under two years, operated upon in hospital, five died ; in five cases over two years of age, there was no fatality. On the other hand thirty-one cases were treated outside the hospital without a death ; nineteen were under six months, six between that age and one year, and six were more than a year old. These small patients require incessant care, especially in the matter of feeding.

D E N T A L M E C H A N I C S.
D E N T A L L A B O R A T O R Y.

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Continued from page 351.

CASTING IN METAL.

The requirements for this work are :—

A strong deal box about twenty-two inches square and eight inches deep, with a quantity of sand, or loam, sufficient to occupy half the space in the box. Some half dozen casting rings are also wanted, these are usually made of iron and are about three inches in depth and from three to four inches in diameter, and may be obtained at any of the dental depôts.

Much neater and cleaner casting rings may be obtained by getting sections of thick brass tubing ; these sections can be cut to any length, and one can obtain gradations in diameter that will admit of one fitting into the other. They have the advantage over iron, inasmuch as they do not rust, and therefore do not contaminate the sand by portions of the mould flaking off.

Besides these appliances, it is needful to have a common knife with a blade about two and a half inches long, also a double-ended steel spatula, and a pair of tweezers.

As a valuable adjunct to the coke furnace previously mentioned (Fig. 3) the workroom should not be without one of Fletcher's gas ladle furnaces. This is most handy and convenient to use, as it does not entail the trouble of lighting a

coke furnace, simply for the sake of casting a die and counter.

This furnace should be so placed that the fumes of the gas shall go up the chimney.

Thin wrought-iron ladles should be used with this furnace for melting the lead and zinc.

The sand should be kept quite free from all particles of zinc, lead, or other impurities, and after it has been used it should be pushed in a heap against one side of the box, and moistened either with a little stale beer or water ; this leaves it ready for use the next time it is required. When adding water, etc., to the sand, care must be taken not to make it too moist, or else it will adhere to the plaster model, and will also cause the zinc to bubble when it is poured into it, and so destroy the cast. The sand should just hold together when a handful is taken up and pressed. Should impurities or particles of metal get into the sand, it should be dried and sifted through a fine sieve.

The plaster model to be cast should represent if possible the thickness required in metal, and prior to being cast should have been boiled out, either in a mixture of resin and wax, or stearine, and then allowed to cool. Another plan is to dry and varnish the model, with methyated brown spirit varnish.

The model must now have all undercuts filled in, and all defects made good ; it should also be padded slightly, that is, have a thin film of wax melted on to the rugæ, if they are pronounced ; in fact any prominence that is likely to suffer in swaging up the plate should be treated in this manner.

The model should now be dusted with French chalk, or Lycopodium, and placed on the floor of the sand box. A casting ring is next placed around it, then sand is sprinkled over and pressed down at the sides of the model, whilst the mould is filled up with more sand which is pressed or ham-

mered down with a light wooden mallet. Any surplus sand should now be smoothed off, and the mould turned over, thus presenting the bottom of the model to view. It is presumed in this instance that the model presents no difficulties to prevent its easy withdrawal, so it may be removed from the sand by either one or other of the following methods :—

First, take a steel point, (an excavator with the point broken off and re-sharpened makes a very suitable one), and drive it a short distance into the centre of the under surface of the model with a light hammer, say one about the size of that used for rivetting.

The steel point should now be held in the left hand close to the end, and should be gently tapped on each side close to where it enters the model, this is to loosen the model.

We next hold the steel point with the thumb and finger near the model, so that we can rest the points of the other fingers on the edge of the mould, this is to steady the hand during the withdrawal of the model.

The point should now be tapped gently on the end, not to drive it further into the model, but rather to loosen the model as it is raised from the sand. This method of withdrawing a model is most useful in those cases where one has sometimes to tilt the model a little in order to get an impression of a slight undercut.

By tilting is meant giving the model a slight bias away from the undercut part. Thus, supposing the undercut is on the lingual surface of the lower teeth, then the model should be gently raised, giving it at the same time a slight pressure against the sand in front. Supposing on the contrary, that the undercut is present on the labial aspect of an upper model then the bias should be against the back part of sand mould.

The art of casting in sand properly is only to be acquired after a good deal of practice ; it requires much patience, a

steady hand combined with great delicacy of touch, and it should be constantly practised by the pupil during his period of training.

The second method for removing a model from the sand, is to take the casting ring in the left hand, with the model downwards, and gently tap the bottom of the model with a small hammer ; it will then drop out. Care should be taken that there is some sand for it to fall upon, or else it is likely to be injured. If the sand impression is perfect it should be placed on one side until the remainder are cast, and then, if the zinc has been put on the fire to melt, it will be ready to pour.

On no account must the zinc be made too hot, but only just be melted, and while in the molten condition some sal-ammonia or fat should be thrown into the ladle, this prevents oxidization, and produces a clean surface on the molten metal.

When pouring the zinc into the mould it should run down one side ; if it is thrown in all at once, air may be imprisoned in the mould, causing a spluttering and "blowing" of the metal to take place, and so spoiling the cast.

A thin wrought-iron ladle is the best to use if one is melting zinc or lead in one of Fletcher's gas furnaces—but if an ordinary brick furnace is used, then a strong cast or malleable cast-iron ladle is more economical, as it will last out five or six of the ordinary kind.

When set, the zinc model should be removed from the sand and cooled, and if the zinc has not been overheated, the sand will part from it readily and leave the zinc with a clean bright surface.

Apart from the fact that the overheated zinc makes a bad cast, the metal oxidises rapidly and a considerable waste of metal is the result.

The next business is to make the leaden counter dies, and

we should be guided in this respect by the size of the plate wanted.

If the plate we propose to swage up is not required to cover the palate, we may use an iron mould similar in shape and size to the casting ring, (Fig. 38), (only with a bottom to it), and have it nearly full of melted lead.

The model should not be dipped straight into the molten lead, but slightly tilted, the teeth placed in first, and the back part slowly lowered to the required depth ; the object of this is to allow air to escape at the back of the palate.

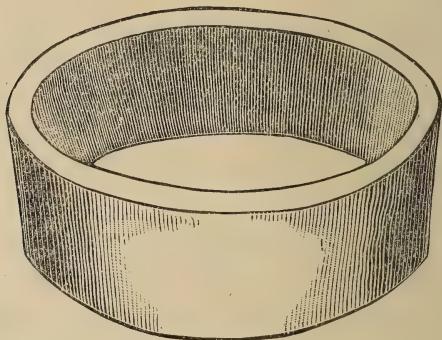


Fig. 38.

The model can be held between the thumb and fingers and inserted just as the lead is on the point of cooling, therefore before it has time to burn one's fingers the lead is sufficiently set to hold the model in place. In lieu of the hand, a pair of tongs, or an old worn-out pair of forceps will answer the same purpose.

It is a very common mistake to dip the zinc model too deeply into the lead ; it not only takes away from the substance of lead to strike into, but at the same time renders the swaging process more difficult.

Two dies and counter dies are usually sufficient for an

ordinary plate, but if an extra die should be necessary, then it should also have a new counter-die.

A warning may here be given that the mould be kept free from moisture, or else the steam generated when the molten lead is poured into it, will cause an explosion and scatter the lead about the place. It is as well always, when pouring either lead or zinc, to keep the face as far removed from the mould as possible.

When a perfect impression of the palate in the counter-die is required, it is necessary to proceed in a different manner to the foregoing.

In this case we take the zinc model, and sink the base of it in a bed of sand, leaving exposed the teeth and palate. Now place around this, the casting ring (Fig. 38), letting the edges of the ring just sink into the sand in order to prevent the lead from running out; a little more sand is pressed around the outside of the ring, and in the meantime if the lead has been melted it may be poured into the ring, slowly, until the ring is nearly filled up.

When the lead has hardened, it and the zinc model may be removed from the casting ring, which is made somewhat taper for this purpose.

Another method for obtaining a counter die, and one which possesses certain advantages, is to take the zinc die, and place it on the floor of the sand box, then encircle it with a casting ring, formed of one of the brass sections previously mentioned, and which should be about three inches deep. Fill up the ring with sand as if one was casting the plaster model. Now, if the ring is carefully raised the zinc model will fall from the sand by its own weight. We then take the ring in the left hand, and with a moderately long-bladed knife cut away the sand, bevelling it in such a manner that when the zinc die is replaced the teeth, palate and alveolar borders will be fully exposed (see Fig. 39). The sand should be bevelled

away from the sides of the model to the upper edge of the mould, or according to the size one requires the lead counter to be; it should however, always have a fairly broad base.

The zinc model should now be placed on a smooth layer of sand, the casting ring placed over it, and the edges sealed up with sand to prevent the lead running through. Melted lead

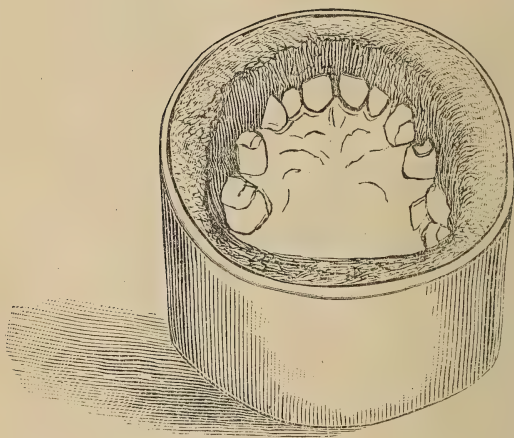


Fig. 39.

is then poured on to the zinc model until the required depth of the counter is obtained; this should be about one and a half inches.

Wrought iron rings are often used to encircle the counter die, during the process of swaging, and are meant to support the lead and prevent it from spreading, thus ensuring a more perfect adaptation of the plate to the front and sides of the alveolar border.

(To be continued.)

British Journal of Dental Science.

LONDON, MAY 1st, 1895.

A RETROSPECT AND A PROPHECY.

As is well known, the Body of British Dental Practitioners still remains a composite one of various constituents. We have recently noted the proportions of some of the elements making up the present Register, and the younger generation, at all events, should be kept posted in our history ; it may help them to make the future record a good one. It is evident that as time goes on, unless new factors be introduced, the list of names on the Register will gradually crystallise into a solid mass of Diplomates, practitioners under the control of the Licensing Authorities and of the General Medical Council. But until that period arrives, the subjects of advertising, registration, diplomas, and Ethics, will form convenient topics for papers and discussions wherever Dentists congregate, and for articles in Dental Journals.

We have recently had the opportunity of reading an interesting communication by Mr. THOMAS GADDES, who contrasts the ethical conditions of the Profession of to-day with the state of things existing sixteen years ago. We may remind ourselves that Sir John Tomes told a Royal Commission in 1881 that, on the authority of the carefully maintained private list of Messrs. Ash & Sons, there were about 2000 dental practitioners in the United Kingdom just previous to the first Register. An additional 2000 registered themselves as practising dentistry "with pharmacy," but on an examination of the Chemists' and Druggists' Register, it was found that some four hundred of these names were absent therefrom. A great effort was made at

the time to get them removed from the Dentists' Register, but the General Medical Council, after much discussion and a legal opinion, decided that they should remain. A thousand other names also found their way into the Register before August 1879. Now Mr. GADDES is of opinion that with respect to the *bona fide* dentists there is a marked improvement in professional decorum. Nearly 700 have taken a Diploma, and "probably more have come into line with the requirements of professional conduct." As a corollary, he thinks that the existing advertising and other objectionable methods are to be traced to some of the 3000. Upon this state of things is founded the suggestion that, considering the way in which they were accepted and registered, the Medical Council should use its most stringent powers to bring this group within tolerable ethical bounds. As our readers know, we would willingly see advertising disappear, but it must not be forgotten that the Council took such men as they were, making no stipulation, and that in order to practise legally they were compelled to register. Then again, what are the powers of the Council? We know it has registered an opinion as to certain advertisements, but we have, as yet, no reason to change our former expressions as to a practical interference.

The Chemist and Druggist, which generally regards Dentistry from the "false teeth" aspect, has recently published an article on the Dental Profession. It admits that amongst the 71 per cent. of registered men who hold no diploma, there may be many indifferent practitioners, "but as a whole they may be regarded as well-trained men." Basing its calculations upon Census returns, and including unregistered practitioners, unqualified assistants and apprentices, our contemporary thinks "the total connected with dentistry in the United Kingdom is something short of 7000." Figures are then quoted to show that the Profession "is actually degenerating in numbers," and the conclusion is drawn that dentistry is not an attractive profession although a lucrative one. Why is this thus? Because the education and curriculum bar the entrance (with which we

agree), and *The Chemist and Druggist* considers this is bad for the public (with which we do not agree), because it may enable Dentists to get ten to twenty guinea fees for a case of artificial teeth! Our contemporary thinks that the Public will find out that the highest qualifications are not required for certain services, and suggests that in a few years there may arise a demand for some simple test in operative dentistry (no mention of dental mechanics), "which will protect those who serve the working classes from harassing prosecution by Dentists in the higher grades of the profession."

DENTISTRY IN AUSTRALIA.--The discoveries of gold in Western Australia have drawn considerable attention to this Colony, and the inevitable "rush" seems to have taken place. In a communication to *The Pharmaceutical Journal of Australasia*, Mr. Fitzpatrick gives an account of his visit. He incidentally mentions that a Dentists' Act has recently been passed, and all chemists now style themselves as surgeon-dentists, and extract teeth for half-a-crown. The author's impressions were most unfavourable, and he is of opinion that the great influx of population to the Colony must not be considered as permanent.

VEGETARIANS AND THEIR TEETH.—According to the modern views of Caries, the remains of animal food in the interstices of the teeth are not so dangerous as the starchy particles. It would seem that people who restrict their diet to vegetable substances run a greater risk of suffering from fermentative processes in the mouth. And whilst everyone should strive to prevent the onset of decay by cleanliness, vegetarians should be especially careful. We are therefore glad to see a lengthy quotation in *The Vegetarian*, from an article on the Hygiene of the Teeth. The proper uses of the tooth brush for children, floss silk, and the toothpick, are clearly enunciated.

SPECIMENS OF METAL WORK.—Mr. Fletcher, of Warrington, thinks that the communication which he sent to the Dental Journals has been misunderstood. He generously offered to present a collection of castings as an educational addition to museums in Dental Schools, and mentioned the name of a firm who could supply the necessary cases for holding the specimens. He now points out that if he had promised to supply cases also, it would have meant an expenditure of something like two hundred pounds. Still where there is any difficulty, and no suitable case exists, he is prepared to present a plain substantial one, but this kind offer is only applicable to Schools in England, Ireland, and Scotland.

A TIT-BITS TOOTH TALE.—A “bone-importer” has informed a representative of *Tit-Bits*, that artificial teeth are largely made from the Walrus tusk instead of from the genuine ivory of the elephant. As if divulging some mysterious trade secret, the bone-merchant suggests that a visit to the dental depots will prove the truth of his statement. Underground bake-houses or backyard sausage manufactories may be relied upon for some unhealthy excitement, but if *Tit-Bits*, and those of its readers who know no better, could inspect a mineral tooth department, their surprise would equal the satisfaction to be felt in knowing that the bone-importer is many years behind the times. Some of the show cases with sun-bleached collections of celluloid horrors may not prove inspiring to the British public, but even the “Prize Medal” teeth might be relied upon to discredit the walrus story. We may, however, inform *Tit-Bits* that the Curator of the Odontological Society recently appealed for specimens of certain ivory plates to place in the Museum, as they are rapidly becoming rare, even as curiosities.

PRESTON AND DISTRICT DENTAL ASSOCIATION.—We understand that the dentists of Preston and the surrounding district, have recently formed themselves into an association

for their mutual benefit and protection. All the registered and non-advertising practitioners in the town have, we are told, been enrolled as members, and it is expected that as the objects and work of the association become known others will join from neighbouring towns. Unregistered and "covered" practitioners are to be the chief objects for suppression, and, if report speaks truly, there is a large scope in the manufacturing districts. The association also hopes to check "the blatant advertising men," but we would remark that this is a matter much more difficult. In the former class the Dentists' Act and the General Medical Council may be relied upon. Mr. N. Miller is the Chairman, and Mr. C. J. Cowell the Hon. Secretary of the new association, and we hope that they will keep us acquainted with their transactions.

THE FINEST TOOTH POWDER.—*Winter's Weekly* announces that its readers are to be introduced to a tooth powder, (but no, the introduction is the other way round), "at the suggestion of one of the most eminent dentists now living," who himself has provided the prescription. It is described as the finest dentifrice extant, and in order to support this claim, allusion is made to the absence in it of any colouring matter, so harmful to the teeth in the majority of cases. The new powder is (as one might expect), *guaranteed* (by the prescriber?) "to arrest decay," and not only prevents discolouration, but of course gives the teeth a "pearl-like" appearance. Here is an opportunity then, for the practitioner who feels obliged to leave a layer of infected dentine at the bottom of a cavity. An application of the decay-arresting tooth powder should enable him to superpose his permanent metal filling with an easy conscience, for we are told this preparation "is based upon scientific principles." We confess to some curiosity as to whether the eminent dentist is still in practice, and if so, whether he finds it unnecessary to use an excavator?

A FIRESIDE CURRICULUM.—“Adept” writes to *The Chemist and Druggist* wondering why so few of the practitioners who were registered as being in practice before the passing of the Act, have made any effort to obtain a diploma at home, or a degree in the States. He thinks it cannot be generally known that registered men are eligible to present themselves for the L.D.S. *sine curriculo*, or for a dental degree of the U.S.A., by passing the final examination. “Preparation for these examinations does not entail any absence from home previous to sitting for examination. From six to nine months’ close study under an efficient tutor is sufficient to ensure success.” We believe that the Royal College of Surgeons in Ireland still admits candidates without a hospital curriculum, but it is not entirely a “sitting” examination. If we are not misinformed a gentleman was referred not long ago for failing to accomplish a gold filling, before entering upon the written portion of the examination.

OXYGEN IN CYLINDERS.—In regard to the recent bursting of a gas cylinder, the Home Secretary stated in the House of Commons, that scientific opinion differs as to whether such an accident is due to pressure of the gas upon an imperfectly welded tube, or to traces of impure substances in the oxygen. He proposes to refer the question for the opinion of two or three distinguished experts on such matters. Professor Ramsay has made, on behalf of Dr. Bayley, a preliminary announcement, to the Royal Society, of some very remarkable experiments on oxygen. They suggest that it may be split up into two gases of different densities. Two globes filled with oxygen and connected by a glass tube had electric sparks passed through from end to end for some time. Whilst the sparks were still passing, the bulbs were sealed off at the tube with the blowpipe, and the densities of the gases in the two globes were found to differ.

TOOTHACHE AS AN EXCUSE.—An engineman was recently summoned at Rotherham for failing to carefully and dili-

gently attend to his engine at Carhouse pit. Signals were made to the defendant while he was at his post, but he did not answer them, and the officials found him asleep after three hours work. Defendant pleaded that he had had the toothache, and having lost his rest the heat of the engine room had overpowered him. The Magistrate inflicted a fine of twenty shillings and costs, saying that the Defendant would have acted wisely by reporting himself unfit for work.

DISLOCATION OF THE JAW IN EPILEPSY.—Mr. Cecil F. Beadles describes in *The Lancet* a case of dislocation of the lower Jaw during an epileptic fit. It occurred during a severe attack in the night and was afterwards easily reduced. The patient, a youth of twenty, was the inmate of an Asylum, and his jaw has the appearance of being rather loosely articulated. This kind of dislocation is so rare that it is not mentioned in Erichsen's Surgery. Some years ago there were two male patients in the same Institution who could put their jaws out and replace them with ease, but neither was epileptic.

HYPERTROPHY OF THE PULP.—Dr. J. Howard Gaskill, of Philadelphia, narrated the details of a very interesting case at the last meeting of the American Dental Association. A coloured boy about twenty years of age, had a pink spot on one of the central incisors, which could be distinctly seen through either the labial or the lingual wall. There was no external opening and no pain. Six weeks later the palatal wall broke down under mastication, and it was found that absorption had largely removed the dentine. Some two years afterwards a similar condition appeared in the other central incisor, and was shown to several dentists. Dr. Kirk suggested a course of treatment with iodide of arsenic and Fellows' Hypophosphites, and strange to say the pulp was assuming its normal condition and the spot was hardly discernible.

DENTAL EDUCATION.—Dr. A. C. Livermore discussing Dental Education from the scientific aspect, incidentally says that Dentistry is an ignoble and degraded calling when its practitioners make it so ; but it is dentistry still, much as we may decry and despise the charlatan. It has to do with the teeth, and the people still call it dentistry. But even this is, after all, only the stamp upon it. If dentists become learned, pure and noble in mind and character, self-sacrificing in their practice and their service to humanity, dental surgery will be elevated to a greater height than it has yet attained, not because it is dentistry, but because of the men who honour the calling by becoming dentists. Then quackery and cheap-John-ism will take wings with the morning and fly to the utmost parts of the unknown. Medicine and law are *per se* noble professions, worthy of the highest intellectuality of man. The one, because it administers to suffering and disease ; the other, because it rights wrongs and punishes wrong-doers ; but as practised by some of their members, these professions become ignoble and unworthy to the last degree ; and yet such men are doctors and lawyers still. While dental education is largely a question of political economy, in that the people should be protected from incompetency and dishonour, it is doubtful if legislation upon the subject can accomplish the long-looked for end. It may suppress total ignorance to a greater extent, but it cannot force mediocrity into thorough competency. The reformation must come from within. We must become self-generated.

A NEW DISEASE.—Reports from Berlin state that an epidemic now prevailing in the South-western parts of that city is considered by Professor Virchow to be the human form of the foot and mouth disease. The most characteristic symptom is the occurrence of blisters in the mouth, and infection is probably caused by drinking milk from diseased animals. There appears to be an incubation period of several days.

SENSITIVE DENTINE.—Dr. Barrett says that pain is the index to abnormal conditions. Normal tissues are not sensitive. There is no true nerve tissue in the dentine. The protoplasmic elements contain the elements of nerve and other tissues, but normal dentine is utterly and entirely without sensation. How often do you not, in excavating a cavity, expose and touch the pulp and the patient is not cognizant of it, but if you allow it to remain exposed until it becomes inflamed, then it becomes exceedingly sensitive. Only when abnormal through irritation does it awaken to the power of conveying the sensation of pain.

Dr. COWARDIN, on the other hand, thinks that the sensitiveness of dentine is due largely to individual idiosyncrasy and constitutional conditions. Patients of rheumatic and gouty diathesis suffer exquisitely from sensitive dentine. The dentine is abnormally sensitive from constitutional irritation.

MANAGEMENT OF SMALL AND TORTUOUS CANALS.—Dr. C. N. Johnson in considering this subject feels some diffidence and humiliation in the face of the claims which are occasionally made by operators, that they can fill all canals successfully up to the apex. He himself has seen too many sections of roots to allow him to say the same. When the opening has been found it should be sufficiently reamed out to give an indication as to the size and direction of the canal. Then a small stiff broach should be used to explore the canal as far as possible, and when the broach refuses to go any farther after conscientious effort, it may be taken for granted that the calibre of the canal is so small that little or no trouble will supervene as the result of failure to clean beyond the point reached by the broach. An antiseptic should be worked well up into the canal by flooding the chamber and manipulating with the broach. Tortuous canals are followed to the best advantage by taking a small, freshly filed, smooth

broach of piano-wire, and curving it from time to time to follow the curve in the canal. There is little danger of breaking a broach of this kind in the canal, no matter how much of a curvature it may have. In the attempt to fill such canals as these it is folly to use any material which is not semi-fluid on its entrance; something which cannot be pumped into position and worked into inequalities and interstices with the broach. Such materials as gold, lead, tin, wooden points, medicated cotton, etc., are contraindicated here if nowhere else.

PULPS, CANALS, AND BRIDGES.—Mr. J. R. Osborne, speaking of what he had learned by experience, says he knows it is not good practice for him to cap a pulp that is in the least degree inflamed or diseased. He has not been able, as some say they do, to cut away part of the pulp and leave it a comfortable success under a cap of anything. He judges of the possibility by the amount of trouble the pulp has already caused. If it has kept its owner awake and busy with drops and liniment, then he concludes it is a fit subject for a funeral, and applies arsenic. For treatment of pulpless teeth he relies more on carbolic acid than on anything, and as a root-filling upon gutta percha and eucalyptus. As to stationary bridges his experience is not very extensive on this line, and though he can safely say that there are a great many cases that indicate this kind of work, he is not so sanguine on this subject as he once was. The exercise of a little more common sense as to the possibilities of this kind of work would be of great use just now, and the introduction of a tooth that can be placed on a piece, without its removal from mouth, would make this class of work more popular than would anything else.

COBALT FOR DESTROYING PULPS.—Dr. C. N. Johnson after a four years' experience, thinks that although cobalt kills

by virtue of the arsenic it contains, it is much less likely to cause pain and yet is quite as effective as arsenious acid. The method of using cobalt is as follows : After complete exposure of the pulp is gained, a small pellet of cotton, less than the size of the head of a pin, is moistened slightly in one of the essential oils and carefully dipped into the cobalt. The moist cotton will pick up a minute quantity of cobalt, which is then carried to the cavity, and the cotton and cobalt placed immediately on the exposed pulp. Some oxyphosphate cement is flowed over the cotton to perfectly seal the cobalt in the cavity, great care being taken not to cause pressure on the pulp. In nearly every case of pulp-destruction, cement is used as the sealing agent in preference to gutta percha. Cement admits of greater certainty of adaptation to the cavity walls, with less danger of pressure, and it has long been recognised that much of the pain occasioned in pulp-destruction is due to pressure. A radical departure from the usual method is now taken in regard to the length of time the application is allowed to remain. Most practitioners, if we are to believe the literature of the subject, allow arsenic to remain only twenty-four hours,—none of them longer than forty-eight. Instead of this, it has for several years been the writer's custom, where molars and bicuspid have been under treatment, to allow cobalt to remain sealed in the cavity one week.

PREVENTIVE TREATMENT.—Dr. Perry says : “ For many years it has been my habit with soft teeth that are just erupting to wash out the fissures and put a pat of oxyphosphate in them, even if they are not softened at all. If they are dried out, the filling will usually stay, even if no cutting has to be done. This serves as a protection while the gums lie over the ends of the teeth, and while they are still unused in mastication. When the tooth gets well through, and is antagonised and used, the danger of softening of the fissure is greatly lessened. When the upper molars are through they are treated in the same way.”

PAINFUL DENTAL OPERATIONS.—In a discussion on Filling Teeth, Dr. Frank Abbott said that while many operations in the mouth were more or less painful, it was the duty of the operator to inflict as little pain as possible consistent with the proper performance of the operation. They are so easily rendered excessively painful by careless operating, but in order to encourage people to have their teeth cared for, as little pain as possible should be inflicted. It is exceedingly difficult in many cases to adjust the rubber dam without inflicting severe pain, and for this reason Dr. Abbott has abandoned its use except in extreme cases. It takes so much time and gives so much trouble and causes so much pain that its use is superseded in his practice by other means that occasion less pain, give less trouble and consume less time. Time wasted in accomplishing something unnecessary can never be made up again. In the use of obtunding material, twenty-five or thirty years ago, arsenic was almost universally applied in cases of sensitive dentine, and the result was numerous dead pulps, abscesses, etc. Now the country is flooded with all kinds of nostrums from all parts of the country. The *alkalies* are nature's natural obtundent. The teeth are not naturally sensitive, but when inflamed under the action of the acids which cause decay, they become excessively sensitive. An alkali counteracting the acid restores the tissues to normal condition. Soda answers every demand and is usually harmless, but the patient must be put under regular treatment for some time, as follows: A teaspoonful of soda in a glass of water, using a little to rinse the mouth and hold in contact with the teeth twenty or thirty times a day. The second day the proportion of soda may be doubled. Then the soda may be placed directly in the cavities, and by the fourth day the teeth can usually be cut without pain. Very much of the pain attributed to dental operations is caused by bungling operators. There is everything in knowing just what you want to do and how to do it.

Abstracts of British & Foreign Journals.

THE ELECTRO-CHEMICAL THEORY OF DENTAL CARIES.

By S. B. PALMER, M.D.S.

The test was made on amalgam, over gold, for preserving frail teeth. The principle taught then and now, is that by chemical activity amalgam becomes corroded and imparts metallic salts to the dentine, being oxides, sulphides, etc., which enter the tubuli and fill the spaces which in normal dentine is filled with the lime constituents. The salts, with the organic element form an insoluble compound and thus decay is arrested. What really occurs is the same that takes place in a battery with copper and zinc elements in a liquid of sulphate of copper ; when the copper becomes attached to the zinc, the plates are said to be polarized, equivalent to two plates of copper and the current ceases. Thus it is that amalgam containing copper is used instead of silver and tin with gold or platinum. As the alloy approaches gold in its resistance to oxidation it loses its virtue in the filling of the dentine. The colour imparted to dentine which is in the condition to be preserved by it is disagreeable ; besides, in large shallow cavities in molars with slight undercuts, especially where the surface is covered with softened bone, this principle often fails to meet expectations, because when moisture reaches the filling, which it will before the mass becomes hard, by capillary attraction, the entire surface of the bone under the filling is wet. No perfect work in inserting can overcome this law : the effect in this action is at once set up, upon the surface of the amalgam next to the dentine on the plug itself, between the fillings or shavings of the alloy, and that portion which is already amalgamated. The decomposition is so rapid that by the acid the lime in the bone is dissolved still more, the metallic salts are wasted instead of filling the bone as would be the case in smaller cavities in more dense bone. To meet this condition he uses a lining of cement the same as would be used in setting crowns, only mixed thinner. Mix the amalgam, then dry the cavity, paint the surface as thinly as

possible with the phosphate, introduce the amalgam and with a ball burnisher go over the surface, working from centre to margin in a manner to force out all the cement possible, clean the enamel borders of cement and finish the filling. There are several points gained by this lining. There will be no moisture between the filling and walls of cavity, the dentine will be sealed perfectly; the surface of amalgam will also be protected from the chemical change already mentioned. And another consideration, an amalgam which is placed upon a lining of cement, varnish, tinfoil, or into a cavity of normal density does not discolour upon the outer surface like one undergoing electrolysis upon the hidden surface, except in cases where the filling touches gold; then we expect to find the surface black, because of a law which debases the positive element as it exalts the negative in all battery elements. An amalgam is not a homogeneous mass; there are currents and counter currents upon the surface; when that takes place upon the hidden surface, all the elements are affected which accounts for discolouration on surfaces where vigorous action is going on beneath. Another practical lining is found in tinfoil. We have no better metal for tooth preservation than tin, and this is coming into use now that it can be used cohesively in shavings. Tin is a poor conductor and oxide of tin is white and with dentine is insoluble under fillings.

Could we use an amalgam of tin and mercury we could depend upon it for its preserving properties. When a cavity is prepared for amalgam take a small piece of tinfoil, no matter if it be two thicknesses, lay it over the cavity, and with a ball burnisher form a lining—no harm if the tin overlaps the enamel. Fill up to the enamel and remove the rim of tin, which will readily come away on a line with the filling; finish the filling without exposure of the tin, and there will be, in effect, a tin amalgam filling and more, the currents mentioned between the particles of alloy, and mercury will be blended. So there will be little chemical action on the plug on the surfaces touching the dentine. This brings us to the most practical illustration of Electro-Chemical teachings; insulation instead of antiseptic treatment. We do not underrate the latter for the conditions where antiseptic treatment meets the demand. The Electro-Chemical Theory teaches that there is a demand for insulation while the accepted etiology of caries recognizes no such demand. Re-decay or decay around conducting fillings is an established fact, it is based upon well known electrical laws, governing elec-

trollysis. A mere denial of such laws will no longer satisfy the coming dentist as he becomes acquainted with oral electricity. When a cavity is prepared for filling a strong glass presents a roughened surface the more so as the dentine is less dense. When such cavity is filled with gold, tin, or amalgam, there are fine scratches from the instrument as well as of the open tubuli which are not filled, and as previously mentioned, moisture by capillary attraction fills such spaces. As we have stated, heat is another phase of electricity; also by chemical activity in the mouth, by acids and food containing carbon, chlorine, etc., the filling stands at a higher potential than the positive elements such as organic constituents of dentine. In all low grades of dentine disintegration occurs by the current conveyed through the plug to the moisture and animal matter lining the cavity, with results discouraging to every operator who believes that "failure is due to defective manipulation." It is better that this space be filled with a substance of low conductivity and one which prevents chemical change by excluding moisture. Nothing is better than chloro balsam. Paraffin is a good insulator but objectionable on account of the smooth surface given to the dentine which renders it more difficult to retain the first few pieces of the filling. He believes that all metallic fillings, as well as gutta-percha, are improved by a thin lining of chloro-balsam, copal ether, or some like varnish for reason already given, except for contour fillings of gold. Care should be taken that enamel which is to retain the plug is not coated with varnish or paraffin; there will be no mechanical bite of the gold with the enamel; no friction other than undercuts. For gutta-percha, those who have not used it, have missed a great helper. In a varnished cavity each piece of filling unites with the varnish, and is held until other pieces are added, and when the filling is completed the surplus can be cut away without drawing the filling from the walls of the cavity. In this way a gutta-percha filling can be inserted which will not leak. It is true that there are some who do not recognize secondary decay as differing from primary decay.

As re-decay is accelerated by electrolysis caused by currents generated from galvanic action by reason of the fillings, there is a demand for knowledge how to insulate such currents and thereby prevent decay.

JUMPING THE BITE.

By R. OTTOLENGUI, M.D.S., New York.

A few men, most prominent among the number being Dr. Talbot, of Chicago, have tried to prove that the operation is impossible. They have descanted learnedly about the relation of the jaw to the articulation, in the compulsory new pose. All sorts of irrelevant theories have been advanced to show that the jaw cannot, and will not, adopt a new closure. All this talk undoubtedly will create a doubt in the minds of those who know nothing about the matter, and who, having never undertaken the operation, are as ready to believe one side as the other. It also serves a satisfactory purpose to those who, having made the attempt, have failed, as Dr. Talbot tells us he has, using that failure on his part as one of the arguments against the possibility.

But of what avail is all this theorizing with those who have tried it and have succeeded? When I say that it is possible to "jump the bite," I know that it can be done, because I have done it, not once, but many times.

As to the method of accomplishing this, it is as follows: The frontal prominence of the superior jaw having been reduced as much as is possible, the lower jaw is moved forward to a good occlusion with the anterior part of the jaws, little consideration being given to the posterior teeth. The lower jaw must not be progressed, however, beyond what becomes a part of the best facial contour, especial observation being given to the pose of the lips, and the relation of the chin to the rest of the features. As soon as it is decided just where it is desirable to have the lower jaw, a plate is made which snugly fits the roof of the mouth, and which has, at the anterior part, an inclined plane, which not only prevents the closure of the mouth in the old position, but, by catching the tips of the lower teeth, causes them gradually to slide forward in closing, so that the mouth shuts in the desired pose. This plate is worn until the habit becomes fixed, or until the retaining fixture is finally abandoned.

The new bite may become a new habit in two or three months, and I have seen a child adopt it in less time, without the inclined plane, and with nothing whatever to produce the change except an indomitable will power, and sufficient interest in her own welfare for her to second the efforts made in her behalf.

Dental Practitioner.

Reports of Societies.

STUDENTS' SOCIETY, NATIONAL DENTAL HOSPITAL.

The usual monthly meeting of this Society was held on Friday, April 5th Mr. Alfred Smith, President, taking the chair.

The minutes of the previous meeting were read and confirmed, and the usual welcome having been given to visitors, Mr. L. H. Canton was proposed for membership, to be ballotted for at next meeting on May 3rd.

CASUAL COMMUNICATIONS.

Mr. Jenkin showed a right lower molar which had been crowned with gold by a dentist not connected with the Hospital. The patient stated that since the crown was fixed she had not been able to use the tooth for mastication on account of pain on biting, she had therefore returned to the dentist who drilled a hole in a cusp of the crown, and injected carbolic acid. As the pain on pressure continued, and there was considerable periostitis, the patient came to the Hospital and the tooth was extracted. The crown was found to be badly fitted to the root, and there was an excess of osteo causing pressure on the periosteum, which was obviously the cause of the trouble.

Mr. H. ROSE mentioned a case where the patient was suffering great pain in an upper bicuspid which was seen to be beautifully filled with gold. The gum was painted with iodine, but the patient returned the next day with swollen face. Mr. Rose therefore drilled through the filling and searched for the canal, but owing to non-success the tooth was extracted and cut open. The canals were found to be entirely filled with gold which had diverted the drill through the side of the root, demonstrating a disadvantage of filling roots with gold.

Mr. ROSE also stated that a patient (a little girl), was brought to him with the history of a blow on the upper centrals, on examination both pulps were found to be dead, and there was a discharge of pus from the ear, which ceased after the treatment of the affected teeth.

Mr. NICHOLLS showed a right upper molar which had been extracted on account of pain. As the tooth presented no

visible signs of caries, and the gum appeared normal, Mr. Nicholls diagnosed either exostosis or pulp stones. The tooth was removed and found, on being opened, to contain two fairly large pulp stones.

Mr. NICHOLLS also showed a specimen consisting of an extracted left upper wisdom tooth with a piece of tuberosity of superior maxilla attached. Very little force was used in the operation. He also exhibited a preparation illustrating a case where a right lower canine root had been extracted, the operation causing a fracture of the alveolus due to long continued chronic abscess. The portion of alveolus was left in situ with the hope of natural repair, but after three days on account of great pain and inflammation, the sequestrum was removed together with three incisors.

Mr. SPOKES showed several photographs of tooth tissues, and a right angle mallet by P. Buss, of Berlin, which would allow a straight point to be substituted for the right-angled one.

Mr. H. J. RELPH showed models of a case of severe protrusion of all the upper incisors occurring in a female patient *æt.* 50. The patient stated that the deformity had been getting worse for many years.

Mr. H. ROSE suggested that the action of the lower lip may have exaggerated the protrusion.

Mr. RELPH replied that in this case the lower lip could not be made to meet the upper incisors without muscular effort.

Mr. SPOKES mentioned Mr. Champion's cases of protrusion, brought before the Odontological Society, where the bite of the molars was abnormal, but in this particular instance the bite at the back of the mouth was good.

The PRESIDENT then called upon Mr. Thos. C. Reece for his paper on "Caries: and the Treatment of Advanced Caries," which is published at page 385.

Mr. ARNOLD PRAGER, referring to Mr. Reece's new root filling material, wished to know whether anyone present had tried glycerine on cotton wool, as he had tried it with some success.

Mr. GREETHAM asked Mr. Spokes for further information concerning the use of Izal as an antiseptic in root filling. Mr. Greetham also stated that Mr. Foster Flagg recommends that undressed cotton wool should be used in preference to the ordinary variety.

Mr. NICHOLLS asked Mr. Reece whether he had had the opportunity of seeing a root which had been filled with his

new material for a considerable time, as he thought that possibly the material would be absorbed. Mr. Nicholls also thought that whether the pulp of a tooth should be capped or not, was a question to be determined by the physique, etc. of the patient.

Mr. SPOKES in reply to Mr. Greetham said that he still uses Izal, and finds it answer in a large number of cases; he thought that with regard to many of the different preparations for cleaning roots one was as good as another in certain cases. Mr. Spokes was surprised that Mr. Reece had omitted mentioning Miller's experiments, which consisted of ignoring the canals in treating dead teeth. In putrid cases, Mr. Spokes sometimes employed Kalium Natrium, and then Izal.

The PRESIDENT referred to Mr. Reece's remarks on Arrested Decay, and mentioned the case of a patient in his own experience, who, whilst abroad in a bad climate suffered from dysentery, and whose teeth had been quite extensively attacked by caries, but on returning to England, in a short time the affected portions of the teeth had become dark coloured, and so dense as to be not easily cut with a sharp instrument.

Mr. REECE in replying to those gentlemen who had taken part in the discussion, said that he had had no opportunity of seeing roots which had been filled with his composition some time ago, but thought that it would remain too hard to become absorbed. He also thought that in the great majority of cases, there was nothing better for the pulp than the natural cap of dentine.

The PRESIDENT then called upon the meeting for a vote of thanks to Mr. Reece for his excellent paper. This was very heartily given, and the meeting then adjourned until May 3rd, when Mr. Harry Rose will give a demonstration on Continuous Gum Work.

Dental News.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

At the next Meeting of the above Society, on the 6th inst., a Paper will be read by Mr. F. J. Bennett, on "The Subject of Dental Caries," (with illustrative specimens).

Mr. Storer Bennett will exhibit and describe: (a) "An Odontome arising in connection with a human upper central

Incisor." (b) "Two Odontomes connected with the lower Canines of a domestic pig."

A Casual Communication will be brought forward by Mr. Oswald Fergus on—I. "A Pair of Scissors for adjusting Rubber Dam and Ligatures around Teeth." II. "Three Pairs of Pliers for Lower Crown Work. III. An Automatic Alloy Holder."

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

The following were the questions in the written portion of the Second Dental Examinations held last month.

(Two questions in each section to be answered.)

Section 1.—*Surgery.*

1. Distinguish between malignant and syphilitic ulceration of the tongue, and give the treatment in each case.
2. State the causes, symptoms, and treatment of Periostitis (say of the Tibia).
3. Describe a case of dislocation of the lower jaw, stating how it may be produced and reduced.

Section II.—*Medicine and Materia Medica.*

1. Mention the sources of Magnesia and its preparations, stating also in what doses they are administered.
2. Differentiate a laxative, a purgative, and a drastic hydragogue cathartic. Give two examples of each, describing their modes of action, and mention the doses.
3. Give the diagnosis and treatment of a case of odontalgia of facial neuralgia, and of inflammation of the dental pulp respectively.

Section III.—*Dental Anatomy and Physiology.*

1. Identify and describe microscopic specimens Nos. 1, 2, 3.
2. State the theories regarding the nature and position of the "basement membrane" in the genesis of the dental follicle.

3. Give an anatomical description of the temporo-maxillary articulation in man, and state the chief characteristics that differentiate it from the purely carnivorous and herbivorous types.

Section IV.—*Dental Surgery and Pathology.*

1. A tooth pulp being nearly exposed through caries, how would you proceed (a) to fill the tooth keeping the pulp alive, (b) to fill the tooth by way of destroying the pulp.
 2. State the causes, diagnosis, and treatment of Dental Exostosis.
 3. State briefly the order of eruption of the second set, and give some of the conditions which may arise during this period requiring the interference of the dentist.
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DEVON AND EXETER DENTAL HOSPITAL.

The Mayor (Mr. Alfred S. Perkins) presided at the Annual Meeting of the Devon and Exeter Dental Hospital.

The Committee of Management in their report expressed renewed anxiety as to the future financial position of the Hospital. The usefulness of the institution continued to be fully appreciated, 3,764 patients having availed themselves of this charity during the past year. The receipts for the year just closed had been £120 18s. 1d., and the payments £135 1s. 6d., showing a deficit of £14 3s. 5d., which, after deducting £9 14s. 2d. brought from 1893 account, leaves a balance of £4 9s. 3d. due to the hon. Treasurer on 31st December, 1894. The three previous years' income and expenditure were :—1891, income £153 8s. 3d., expenditure £145 1s.; 1892, £131 5s. 7d., £150 9s. 10d.; 1893, £220 9s. 10d. (this included life governor's donation of £52 10s.) £164 15s. 6d. The committee regret the loss which they sustained by the death of their late hon. treasurer, Mr. Fred Townsend, who for many years took an active interest in the welfare of the institution. Mr. J. M. Acland had kindly consented to carry out the duties of this office. The late hon. secretary having resigned, Mr. Henry Yeo had,

by request, placed his services at the disposal of the committee. The committee recommend the re-election of the two retiring members of the Committee of Management, Mr. W. T. Bayne and Mr. G. Franklin, with the addition of Mr. C. R. Collins ; also the re-election of the hon. treasurer, Mr. J. M. Acland. The committee regret to find that in the distribution of the Hospital Saturday Fund their share had been reduced by one-half, i.e., from 20 guineas (10 subscription and 10 donation) to 10 guineas (5 subscription and 5 donation). This reduction is a most serious matter. The committee again urgently appealed for liberal support.

The Mayor moved the adoption of the report. He regretted that the people of the district did not support the Hospital more liberally, and so prevent its operations from being crippled. Dr. Dangar, who seconded, said he was sorry that the Hospital Saturday Committee had reduced their grant from twenty to ten guineas, whereas to those societies whose balance-sheets showed they were not so much in need of support, the grant had been increased. If the usual amount had been voted to the Dental Hospital, there would have been no deficit. A representation on the subject ought to be made to the Committee.—The report was adopted. Mr. J. H. Ley was elected president for the ensuing year, and a vote of thanks was passed to the retiring president, Mr. Franklin for his services. That gentleman, in response, also made allusion to the meagre and pitiful amounts given by the Hospital Saturday Committee to the Institution.—In replying to a vote of thanks for his services in the chair, the Mayor said he would try to bring some influence to bear to restore to the Hospital the original contribution from the Saturday Fund Committee. The Institution did an immense amount of service both in assisting the medical profession and in relieving suffering humanity.

GLASGOW DENTAL HOSPITAL.

At the tenth annual meeting of the Glasgow Dental Hospital, Mr. D. M. Alexander, the secretary, submitted the annual report, which showed that the number of cases treated in the hospital was 7122, being an increase of 1395 as compared with 1893. Of that number only 3187 were extractions, leaving 3305 preservative operations. The hospital had now completed the first decade of its existence, and during that time no fewer than 59,231 cases had been suc-

cessfully treated. The treasurer's accounts showed that the financial progress of the hospital is being maintained. The ordinary funds in bank at the close of last account amounted to £179 0s. 2d., and this sum had been increased at the close of this account to £211 14s. In addition, the directors had in bank the £100 set aside by them last year as the nucleus of a building fund. During the year there had been a further accession of students, whose fees amounted to £239 8s., as against £160 30s. the previous year.

The Chairman, in moving the adoption of the report, remarked that he had on frequent occasions to deprecate the multiplication of institutions in Glasgow, but the Dental Hospital certainly deserved the support of the community. It had done most excellent work at a very small cost, which could scarcely be estimated.

ACTION AGAINST A DENTIST.

At the Northallerton County Court, before his Honour, Judge E. R. Turner, Isaac Newton, platelayer, Northallerton, sued John Angus, dentist, Darlington, to recover £6, being £4 for money paid for a set of teeth, and £2 for damages.

Mr. E. Gardner, solicitor, appeared for the plaintiff and said [that in September, 1894, defendant called upon the plaintiff and obtained an order for a set of new false teeth for £4 and was paid £1 on deposit. On September 27th Dr. Bartram attended to administer chloroform when Angus extracted a number of teeth for Mrs. Newton. Dr. Bartram then remonstrated with defendant and told him that there were some more to draw. Afterwards Angus said he would have another go, and again Mrs. Newton was chloroformed, and defendant extracted some more of her teeth. Afterwards he said that three more of her teeth would have to be drawn, but she refused to allow him to pull any more. She became so ill, however, that Dr. Bartram was sent for, and he extracted the other three teeth. The false teeth were supplied and Angus guaranteed them to be a perfect fit, and said he would alter them free of charge for three years. On December 10th Defendant was paid another £1, and then on December 22nd defendant sent in a bill for £5, less £2 cash received. Defendant also wrote stating if Mrs. Newton sent £2 10s. by return of post he would settle the bill. On December 22nd defendant called to see Mrs. Newton, and

expressed his regret at having caused her annoyance by the above letter. The false teeth were supplied, and the other £2 paid, but Mrs. Newton could never wear the teeth. A letter was written to him, and he called and promised to make her a new set, but before Mrs. Newton could get them into her mouth one of the teeth dropped out on to the floor. Angus at last took the teeth away with him to repair, but refused to refund the £4.

Dr. Bartram said that he considered the defendant in drawing Mrs. Newton's teeth was rather rough, and the operation was unskilfully performed. There was a great deal of hæmorrhage, and he pointed out to Angus that there were three other teeth which ought to have been drawn. The same night at 11.8 p.m., he was called and drew the three teeth. Mrs. Newton's mouth was very much lacerated. His charge was 30s.

The defence was that it was impossible to extract teeth without pain, laceration and soreness of the gums. Defendant was prepared to carry out the guarantee he had given, and make the teeth fit. His Honour ordered defendant to refund plaintiff the £4 and pay costs.

APPOINTMENT.

Guy William, F.R.C.S., L.D.S. Edin., has been appointed Dental Surgeon to the Royal Infirmary, Edinburgh.

To Correspondents.

Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.

2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
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British Journal of Dental Science.

No. 656. LONDON, MAY 15, 1895. VOL. XXXVIII.

ANTRAL EMPYEMA OF A TUBERCULAR AND SYPHILITIC ORIGIN.

By JOHN KEKWICK, L.R.C.P., M.R.C.S., L.D.S. Eng.

Suppuration in the antral cavity has its cause usually attributed either to tooth disease or to the extension of a Rhinitic inflammation. Some acute cases are reported to have complicated Influenza and other fevers, but it is rare to hear of Antral Empyema having the constitutional origin of syphilis and tubercle; and I know of no recorded case in which the tubercle bacillus has been found in the discharge.

The following cases may therefore be interesting on account of this rarity.

Case I.—A woman, aged 30, came to the Dental Hospital of London in the beginning of the year 1892, complaining of all the usual symptoms of empyema of the left antrum. Mr. H. Lloyd Williams (under whose care the patient was placed) extracted a painful carious left upper second bicuspid and made a free opening into the cavity from the socket. For more than twelve months afterwards all forms of local treatment were faithfully carried out, change of air and tonics were prescribed, but unfortunately resulted in no practical change in the patient's condition. The chronic nature of the case, the history of the patient, and the curdy

character of the pus led to the latter being microscopically examined, when large quantities of the tubercle bacillus were found. Powdered Iodoform was then insufflated into the antrum every other day, the patient using a wash of Carbolic Acid (1-60) on the alternate days, and she was also treated constitutionally. A mixture of Iodoform and Ol: Eucalyptus was once syringed into the antrum, but was so extremely nauseous to the patient that it was not again tried. Rapid improvement took place under the new treatment; the discharge became gradually lessened, and the hectic condition which the patient had commenced to acquire was soon lost. Three months afterwards, the case was lost sight of, but the "cure" was then practically completed.

I diagnose this to be a local tuberculosis lighted up by the inflammatory condition of the tissues round the root of the second upper bicuspid.

The following reasons tend to prove its tubercular nature:—

1. The chronic course of the case, with no local causes such as loose sequestra to keep up its chronicity.

2. The tubercular character of the pus, simulating that of hip-joint disease.

3. The amenability of the disease to Iodoform.

4. The history of the patient. Uncle died of phthisis; sister now suffering from phthisis; no signs of tubercle in the patient herself, but a queried history of tubercular cervical glands (cicatrices).

5. The bacilli in the pus which was washed directly out of the antrum through the nose.

Case II.—In February this year, a man, aged 40, came to the Cumberland Infirmary, under the care of Mr. J. F. Kekwick, dental surgeon, complaining of all the symptoms of empyema of the left antrum. On examining the mouth there was noticed a tumour about the size of a large walnut

in the middle line of the hard palate. The tumour was soft, and fluctuating, and when compressed gave rise to a feeling of fulness and pain over the left malar bone. On firmly pressing the left cheek, the tumour became tense. The left upper bicusps and first molar were absent. The patient had a distinct history of Primary and Secondary Syphilis.

The antrum was freely opened with a trocar through the canine fossa, and on entering it beads of pus burst from the palatine tumour. The tumour being recognised as a syphilitic gumma, potassium iodide was ordered internally, and the antrum was daily syringed with carbolic acid (1-60) passing freely through the nose. In ten days the improvement in the patient's condition was most marked, but owing then to a change of residence, he was unfortunately lost sight of. Although a probe could not be passed from the palate into the antrum, there is no doubt that a communication did exist, and that the maxillary cavity was approached by some carious or necrotic process.

I am indebted to Mr. H. Lloyd Williams and Mr. J. F. Kekwick for leave to publish these cases.

THE TOOTH-BRUSH.—According to Dr. B. F. Arrington, a tooth brush for daily use and to be effective should be shorter and narrower than the majority of brushes on the market, and the rows of bristles should be few and far apart, not more than three or four rows crosswise the brush, with space between rows, from a quarter to three-eighths of an inch. A compact close-bristle brush is objectionable, and ordinarily will do more harm than good to the gums, and in no way benefit the teeth. The object of a brush is to cleanse the teeth, every division of them above gum margin, if possible; hence the necessity for much space between the rows of bristles.

D E N T A L M E C H A N I C S.
DENTAL LABORATORY.

By HARRY ROSE, L.D.S. Eng.,
Lecturer on Dental Mechanics, National Dental College.

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Continued from page 408.

DIFFICULT MODELS WITH UNDERCUTS.

Having described the methods for obtaining a simple die and counter, we now come to those difficult models, of which a satisfactory casting cannot be obtained in the ordinary way.

When the undercut is only trifling and confined to the sides and necks of the teeth, a little padding of wax will do away with it and allow the model to part from the sand. This added portion has to be trimmed away with a file and sculptor from the zinc die before the plate is struck up. With cases of great irregularity it is necessary sometimes to cut the teeth off the model altogether, and when this is required the pins that are put in to strengthen the plaster teeth should be smooth and straight. The plaster teeth may then be sawn partly through and broken, so that they can be removed from the model, and replaced when the zinc dies have been obtained.

A better way than this is to take two impressions of the mouth, and cut off the teeth of one, while the other is left to work to. This method insures the teeth not being misplaced in fixing them on the plaster model again, as might easily take place in the first-named plan.

Another method, and one that spares the patient the inflic-

tion of a second impression, and is at the same time very reliable, is to accurately mould up a plate of composition to the plaster model to copy the gum, but not to extend up the

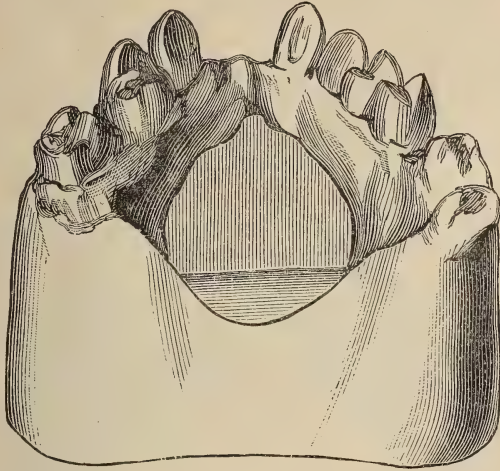


Fig. 40.

teeth; it should be a trifle larger than the plate required. Pour plaster into this in the usual way to form a model, and then use it to get the zinc dies and lead counters, with which the plate is to be swaged.

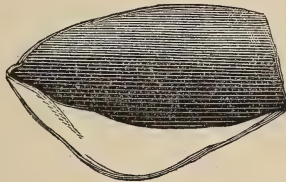


Fig. 41.

If the composition plate is made carefully, a very good fit will be the result, and this without damaging in the slightest degree the plaster model.

Again, there are models which have the rugæ, or the alveolar ridges, considerably undercut, to these it may be necessary to make a core of brickdust and plaster, pumice and plaster, or other suitable materials, in order to fill up difficult places.

The Cores. Fig. 40 represents an upper model with a core filling in a very deep palate. Fig. 41 represents the core itself. Fig. 42 is a diagram of a lower model showing

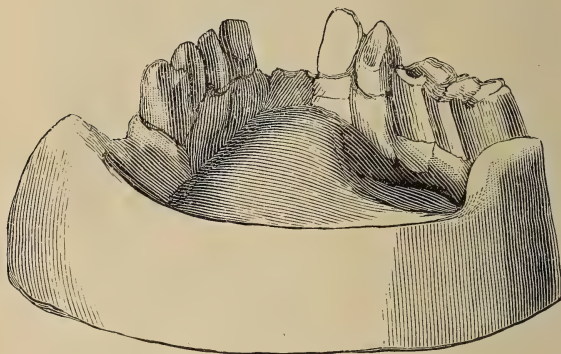


Fig. 42.

an extensive undercut on the right side, caused by the molars leaning into the mouth. This was filled up by the core represented by Fig. 43, and Fig. 44 shows the core in position.



Fig. 43.

It will be seen at once by these models that the object of a core is not only to reproduce the undercut, but that it at the

same time converts a difficult casting into one extremely simple.

The cores should be carefully dried and then slightly fastened to the model with a spot of wax. When the model



Fig. 44.

is cast in the sand, the core or cores should come away with it, and on removal from the model, should be carefully replaced in the sand. The zinc is then poured into the sand impression in the ordinary way. It is perhaps as well to hold the core in position with the steel point until the metal just covers it; there is then no fear of displacing it. By this method one is enabled to cast very difficult and intricate models.

Making Cores. Taking a mixture of about two-thirds brickdust and one-third plaster of Paris, it should be stirred with water to a very thick paste, and kneaded into the irregular space on the model, which should previously have been well lubricated with thick oil or soap, to allow of parting.

Some cores are so difficult to make, (owing to the risk of breaking them in removing from the model), that it is found

necessary to make a composition core first, and to duplicate this in brickdust and plaster.

This is not a difficult undertaking if we make sections of its surfaces either in composition or plaster of Paris. When the sections have been separated from the composition core, a hole is cut through from the outside, and on putting the sections together again, the inside is filled with brickdust and plaster.

There is another method of obtaining a perfect casting, say of an upper model, where one finds it is necessary to bring the plate well over the alveolar ridge. We presume of course that the ridge is so pronounced that it forms a considerable undercut on its labial aspect.

Take an impression of the plaster model in sections with composition as follows:—

After dusting the model with French chalk, soften and mould a piece of composition to the palate. When hard remove it and bevel it to a fine edge, with a sharp knife or file, at the alveolar border.

Make one or two grooves in it to serve as guides, and then apply more composition to fill up the undercut along the labial and buccal aspects of the ridge, moulding it in such a manner that it slightly overlaps the palate portion.

When hard, remove the sections from the model, and fix them together with hard wax. We must now oil the inside of the impression now formed.

A small portion of plaster is then mixed, and poured or pressed into as much of the undercut, as it will, when hard, part readily from.

While in a semi-hard condition in the impression it should be neatly trimmed with a spatula, and any excess removed. The edges should be clear and well-defined, and one or two grooves should be made in it with a half round sculptor; the

plaster section is replaced in the impression. Of course, if it be found necessary, two or more plaster sections may be made, each being treated in a corresponding manner to the one first described. After placing the plaster sections in the impression, the surfaces of impression and plaster sections are to be lubricated, the first with oil, and the latter, with a solution of soap, then the remaining portion of plaster is mixed up and poured into the impression to complete the model.

When the plaster has thoroughly set, the great bulk of the model will part readily from the composition impression, and the two portions that form the undercut may be removed with equal facility.

This model may now be put on to a warm place to dry, after which it should be boiled out in stearine, and it is then quite ready for casting in sand.

Put the different parts of model in position, dust with French chalk, and place the model in the floor of the sand box, inside a casting ring.

Fill in the ring with sand, supporting the sections of model until the sand holds them firmly in position, fill in remainder of sand and press fairly home and smooth level.

The ring is now reversed and a sharp steel point is driven into the bottom of the model, and then, after tapping sufficiently to loosen, the latter is withdrawn in the usual manner. The part that comes away is that corresponding to the palate of the case, and the portions of model representing the undercuts are left behind; these are then withdrawn, without any difficulty, by melting a small spot of hard wax on to the centre of each, afterwards making the handle of an old excavator warm and attaching it to the wax. This will give a sufficiently good hold for the removal of the plaster sections.

By operating in this manner a most perfect model in metal can be obtained.

There is nothing to prevent one from serving the original composition impression of the mouth in the same way as the one described, and it would have this further and important advantage, that it would allow of the plate being easily taken off and replaced on the model, which if the model were in one piece could not be done.

When one has a patient with long and straggling teeth, and a plate is thought advisable, the following plan may be adopted with success to obtain a cast. When the impression of the mouth has been taken, cavities represented by the teeth should be packed with Sullivan's Cement, inserting into each socket at the same time, a piece of iron wire that shall project about half an inch.

The cement is now formed into a cone from the base of the sockets to the point of the wire, and then slightly grooved on each side. When all the necessary cavities have been filled with cement and carefully trimmed up with a burnisher or smooth spatula, plaster may be poured into the impression after it and the Sullivan cement teeth have been oiled. The model should now be laid aside for twelve hours to harden. When ready, it is placed in hot water, and the composition softened and removed.

We now have a plaster model, with metal teeth, which can be removed and replaced with equal facility, in their proper direction, and respective places. The model is trimmed up, dried, and boiled out in stearine, the cement teeth having been previously removed. These should now be replaced, and the model cast in sand in the ordinary manner. In this case the whole of the model, with the exception of the teeth,

comes away first, and the teeth are removed singly from the sand afterwards. Thus a perfect cast with the teeth in position can be obtained—on the other hand, if the teeth in position are undesirable, the model can be cast without them.

By either of these methods most difficult and complicated casts may be made.

(To be continued.)

GOLD AS A FILLING MATERIAL.*

By Mr. A. H. QUINBY.

Mr. President and Gentlemen,—I wish to point out that I do not pretend in this paper to do more than briefly describe the manufacture of gold, and enumerate some of the principal uses of its more important preparations.

A collection of the latter has been kindly lent by Messrs. Ash and Sons for our investigation this evening.

Gold is at the present time the most valuable material at our disposal for the conservative treatment of caries. A gold filling has some disadvantages, the chief of which are its high conductivity of thermal changes, and the time necessary for properly inserting it. On the other hand it possesses great durability, opposes great resistance to the chemical changes continually going on in the mouth, and finally the filling may be built up to any desired contour, and will undergo no change in bulk after its insertion. The principal properties of gold on which these great advantages depend are—

1st. *Cohesiveness*, by which the various portions of gold

* Read before the Liverpool Dental Students' Society.

comprising the filling can be inseparably united to each other.

2nd. *Softness*, which enables the metal to be closely adapted to the cavity wall.

3rd. *Tenacity*, or the great force of cohesion between the particles, enabling the mass to withstand a great strain without fracturing.

It is necessary for the proper development of these properties, that the metal be absolutely free from impurities. The presence of zinc, lead, tin, or copper, for example, in proportions of less than 1 in 1000 parts of gold renders that metal quite harsh and brittle, consequently useless for dental purposes.

Native gold is always alloyed with silver; occasionally small quantities of platinum, copper, and iron, are found accompanying it. Of the many methods of extracting these metals, one of the easiest and cheapest is the process called chlorination. The alloy is placed in a large dry crucible which has been previously saturated with borax, and allowed to dry. The metal is then heated, and while in a molten condition, chlorine gas is passed through it by means of a clay pipe communicating with the bottom of the crucible. The silver and a portion of the other metals which may be present are converted into their chlorides, which rise to the surface and are drawn off, leaving the gold in a comparatively pure state. The process of chlorination is continued until orange coloured fumes begin to arise, owing to the commencement of the combination of chlorine with the gold. Gold which has been refined by this process possesses an average fineness of 994 in 1000 parts. For the preparation of chemically pure gold from this, a much more delicate form of treatment is necessary, the general outlines of which I will proceed to describe.

It is probable that all manufacturers have a method of their own, differing slightly from that of others. The gold probably averaging between .993 and .996 in fineness, is obtained in as pure a state as possible by means of long continued fusion with nitrate of potash, and is then dissolved in aqua regia, the excess of acid being driven off by evaporating to dryness. The Auric Chloride is dissolved in a large quantity of distilled water, and this solution is allowed to stand for some days, until all the chloride of silver which may be present has been precipitated.

It is separated by filtration, and the filtrate then consists of Auric Chloride, and possibly of traces of copper, platinum, and other metals.

From these the gold may be separated by the addition of a clear solution of ferrous sulphate until precipitate ceases to form.

The solution is removed by decantation, and the precipitate which consists of gold is now washed with HCl. to remove any traces of iron. Oxalic acid has also been used for the precipitation of gold from its chloride, and this was the method formerly used for the manufacture of Watt's crystal. Any platinum which may be present has first to be removed, and this can be effected by dissolving the crystals of auric chloride in alcohol and adding chloride of potassium, the double chloride of potassium and platinum separating out.

The chloride of silver is removed as before by largely diluting the solution and allowing it to stand.

The auric chloride solution is then treated with potassium carbonate, which is added in sufficient quantity to convert all the chloride into potassium aurate.

The solution is then again filtered, and oxalic acid is added in excess.

On heating rapidly to the boiling point, the gold is preci-

pitated in a spongy mass, and in a chemically pure state.

The carbonate of potassium prevents the precipitation of copper with the gold, by forming the carbonate of copper, which on the addition of the oxalic acid is converted into the soluble, double, oxalate of copper and potassium, and remains in solution.

Gold is manufactured in two forms for the use of dentists, foil (beaten and rolled) and crystal : the other preparations are simply adaptations of these. The process of reducing the ingot of pure gold to foil, is described by a gold beater, in the "American System of Dentistry" vol 3, p. 839, from which the following notes are compiled.

The gold is heated to a higher temperature than is necessary to fuse it, by which its malleability is increased, it is then poured into moulds previously heated and oiled, and cast into ingots of about 1 in. wide, $\frac{1}{4}$ in. thick, and 4, 6, or 8 ins. long.

These are annealed and plunged into a weak solution of sulphuric acid to clean them.

The next process consists in passing the ingot between two polished steel rollers, gradually brought close together, until the resulting ribbon is of the required thickness, the gold being repeatedly annealed meanwhile.

If it is to be used as rolled or heavy gold, the operation is now finished, it being simply cut, weighed, and annealed finally.

If on the other hand it is to be made into beaten foil, the ribbon is divided into pieces 1 in. square, each of which weighs about 5 gr.

From 200 to 250 are placed between the leaves of a cutch which consists of a packet of French paper prepared for the purpose. A case of strong parchment, open at both ends is drawn over the cutch, which is enclosed in a similar case drawn over it at right angles to the first, so as to cover the

edges which the first case had left exposed. The cutch is then beaten with a 12 to 16 lb. hammer, upon a smooth block of marble.

During this operation the packet is continually rotated so as to distribute the force equally.

When the gold plates 1 in. square are beaten out into squares of about $3\frac{1}{2}$ in, each leaf of gold is taken out and placed into another cutch, larger than the first.

The shoder, as it is called, is inclosed in parchment as before and beaten until the squares of gold are the same size as the leaves of the shoder.

The sheets are then taken out, trimmed, and annealed, and then placed between the leaves of a foil book. The sheets of foil in general use weigh about 4 grs. each after being trimmed.

The foils are divided into two classes, cohesive and non-cohesive. The former possesses the property which enables layers of it to be welded together under slight pressure, which property is common to several other metals, including lead, tin, and iron, freshly cut surfaces of which will cohere. Pure gold can at any time be made cohesive by heating it to a dull red, but it loses this property after a short period.

What then is the action of heat upon gold? It has been found that gold together with platinum and some other metals possesses the curious property of condensing gases on its surfaces, and on the application of heat, these gases are driven away, the surface of the gold becoming chemically pure. There are however, groups of gases, particularly the sulphur and phosphorous group, to which this rule does not apply, and consequently the gold which has been exposed to any of the gases, which unfortunately are very common, loses its cohesiveness, which cannot be restored.

It is necessary to carefully protect the foil from these

influences. Cylinders should be kept in glass phials carefully stoppered, and foil books should always be placed in wrappers and kept in a dry place.

It has been recommended that a bottle of carb. ammonia should be kept in the gold drawer, ammonia having the property of protecting the gold, probably by forming harmless compounds with these injurious bodies.

Gold should always be annealed in the alcohol flame. Cohesive gold is used in the form of the ribbon and cylinders. The former is made by folding the foil upon itself three times by which means we get a ribbon containing eight layers of foil (I am speaking now of foil weighing four grs. per sheet) from which ribbon we proceed to cut strips of a width corresponding to the necessities of the case.

These strips are very well adapted to any form of mallet, and can be relied upon for filling all classes of cavities. They are, however, better suited to building out contours in front teeth, and in all positions where perfect cohesion is essential.

Cylinders consist of loosely rolled foil.

They are manufactured in many sizes, and are used by some operators to the exclusion of nearly all other forms of cohesive gold.

They are well adapted to the automatic and hand-mallets, and can be very conveniently worked by hand pressure. One objection to their use is the temptation to use too large pieces, and care has to be used in their condensation. Exceedingly good and rapid work can, however, be done with them if due precaution is observed. As a rule they should not be used with the engine or electric mallets.

As I have mentioned before, it is necessary in the use of cohesive gold, that every portion of foil should be in complete molecular contact, as far as we are able to bring it about.

Thorough condensation, careful attention to the dryness,

and cleanliness of the cavity, due regard to proper annealing and the use of clean instruments should be observed. Non-cohesive foil, as it is usually sold, can be made cohesive by annealing, although some of it is unaffected by that process.

We have already seen that exposure to certain gases renders the gold permanently non-cohesive. The same result can be obtained by placing gold foil between sheets of a kind of tissue paper, and roasting it until the paper is reduced to cinders ; this process is known as Carbonization. Admixture with iron also considerably interferes with its cohesive properties.

Non-cohesive foil, therefore, is probably prepared by some of these methods, and it has been discovered, at any rate, that exposure to ammonia gas, enables foil to be used non-cohesively, while cohesion is regained by annealing. It is important no cohesive properties should be exhibited by the foil, when being used on the wedging principle. The lead-like softness of the gold, and its adaptability to the cavity wall is dependent on the fact that the layers slide over one another without resistance.

Non-cohesive foil is now used in the form of tape, mats and cylinders. The tape is formed by folding the gold upon itself, until the required width and thickness is obtained. The mat is formed simply by cutting the tape across into square pieces. The cylinders can be made of any size, by rolling tape of suitable width round a fine broach.

Non-cohesive foil can be used for entirely filling cavities having four strong walls, and is extremely useful for laying against the cervical margins of approximal cavities in, cuspids, bicuspid and molars, and for lining weak enamel walls in every position. The ease with which it can be adapted to the cavity wall renders it very useful in many cases.

Although not absolutely necessary [for the production of

good work, it is better not to handle non-cohesive gold, and, when not too inconvenient, the rubber dam should be used, when the work cannot be kept quite dry with a napkin.

Rolled Gold. The foil which is prepared by rolling, exhibits the properties of softness and toughness in a remarkable degree, and becomes exceeding cohesive on being annealed. It can be procured in sheets, weighing from 20 to 160 grains each, but No. 30 is quite heavy enough for all ordinary purposes. In using it, care should be taken that the gold does not crumple up on being folded in the cavity, as it is very resistant to the mallet under those circumstances.

The best way to prevent this is to use small pieces only. Rolled gold is well adapted for contour work, as it can be manipulated quickly, and at the same time will produce a filling of the greatest density.

Approximate cavities in back teeth, where there is little room to work may be conveniently filled with this form of gold.

Pieces should be used of a size to fit the cavity as nearly as possible, and care must be taken to build the gold higher round the edges than the centre during the operation.

Another use which may be made of heavy foil, I was induced to try, from seeing an account of it in Dr. Ottolengui's book on "Methods of filling Teeth." It depends upon the fact that heavy gold can be burnished by means of a warm clean burnisher on to the surface of a filling and will cohere with it. This may be very useful when the contour of a filling requires to be built out a little in some rather inaccessible place, and the tooth is sore with long malletting.

It is a good plan also to form the outer third of any cohesive gold filling with heavy gold, as a beautiful surface can be thus produced, while the first two-thirds of the cavity may be very conveniently filled with cylinders.

Rolled gold is particularly well adapted to the electric mallet.

Crystal Gold. There are several forms of this gold, of which the most useful and reliable is that known as Watt's crystal gold.

This form is prepared by electrolysis. The metal is deposited on a platinum electrode, suspended in a solution of chloride of gold.

The anode or positive pole consists of a plate of pure gold which is also suspended in the solution, and is gradually dissolved when the circuit is completed, and deposited on the platinum plate which forms the cathode.

The density of the mass of crystals can be regulated according to the strength of the current, and the temperature and strength of the solution.

Crystal gold is the most cohesive of all preparations of gold, and requires less force for its condensation. It does not ball up under the plugger, which makes it very useful for starting cohesive fillings, as small portions can be packed into opposite corners of the cavity and then wedged into place by the interposition of a larger portion. It is excellent for filling undercuts and retaining grooves, and also for covering over the portion of dentine nearest the pulp chamber, as the small force requisite for condensation renders that process free from pain to the patient, and at the same time renders an accidental fracture of the thin plate of dentine very unlikely.

Crystal gold should always be manipulated by hand-pressure before resorting to the mallet ; indeed the latter instrument is less necessary with it than with any other form of gold.

Entire fillings are seldom made with crystal gold, simply because very small pieces have to be used, and the operation takes too long. Very beautiful work, however, can be done

with it, and its peculiar properties enable it to be used in cavities which would otherwise be extremely difficult to fill with gold.

There is another preparation which I must mention, consisting of a layer of crystal gold between two layers of foil; it is called Crystalloid gold.

Its use is indicated in those cases where the cavity being wide and shallow, a steady anchorage is difficult to obtain.

A portion of the gold a little larger in size than the floor of the cavity is to be cut off from the sheet, and placed in position. It is then condensed, first round the circumference, then in the centre, when it will be found to make a very good foundation on which to build cohesive gold.

Gentlemen, it has been impossible for me, in the short time at my disposal, to do more than describe a very small proportion of the many beautiful preparations of gold with which the profession is supplied. I have endeavoured, however, to select the most representative forms for discussion and to recapitulate their principal advantages.

It only remains for me to thank you for your patient attention to my notes.

SEPARATING TEETH.—Dr. Holland considers it a crime to put rubber between the teeth for separating purposes; robbing the patients of rest and sleep, and injuring their health. By using cotton you may have to make them wait several days, but you cause them no suffering. Place a ligature between the teeth, then pack in the cotton; tie it down with your ligature and cut off the surplus. This forces the cotton between the teeth where they knuckle, and you can separate them in twenty-four hours.

British Journal of Dental Science.

LONDON, MAY 15, 1895.

AMERICAN DENTAL COLLEGES.

WE have elsewhere noticed *The Transactions of the American Dental Association*, but we may here perhaps be allowed to consider at greater length the Report which was made in Section II., which dealt with Dental Education, Literature, and Nomenclature. From this it appears that the National Association of Dental Faculties still continues to exercise an influence for good. Perhaps no more important or hopeful movement has marked the progress of the Profession in recent years, than the voluntary banding together of the best American Schools. Instead of students drifting to other centres where a shorter curriculum was demanded, it has been found that this class of the community was wise in its generation, and really helped and supported the new movement. There was a decrease in the number of graduates in 1893 and 1894 due to the operation of the three year course but a similar condition of things is noticed with us whenever the curriculum is extended, and it is a matter which generally rights itself before long. At the present time there are thirty-two teaching Institutions which belong to the National Association; those not on the roll are chiefly the ones recently organized, and even these, with a view of rendering themselves eligible for membership, conduct themselves with that end in view. One of the great drawbacks the Association of Faculties seems subject to is due to the ease with which new Dental Schools can spring into existence. Each State is able to do as it pleases, and during the last ten years the number of schools has doubled.

The opinion is expressed that in the future the increase is likely to become even greater, in consequence of the existence of what is described as "a fad" on the part of medical Schools to establish a Dental Department. Out of the forty-four dental Colleges, twenty-seven are "operated" in conjunction with medical departments. The criticism offered upon this easy method of increase (some of the Medical Schools requiring no additional charter and already having teaching provision in several of the subjects) is to the effect that it may be profitable to the Medical school but is not calculated to redound to the credit of the Dental Profession. We are, however, glad to read the first portion of the following quotation, and at the same time can appreciate the humourous allusion in the latter part: "It is not the desire of the Section to deprecate such a condition, for many of the Schools thus connected are among the best of the country; but it should be borne in mind that there are more than two hundred and fifty Medical Colleges in the United States, and the addition of a vermiform appendix to each of these may fasten upon the dental profession a dangerous disease." We do not altogether agree that a Dental Department should be compared with that *cul-de-sac* of the human economy, the function of which appears doubtful unless it be to serve as an instance of a useless and sometimes dangerous survival.

Another matter alluded to is the necessity which exists for some more or less uniform test as to a student's proficiency in General Education before entering upon the professional curriculum. At present every school judges its own candidates, and this leads to "the admission to the ranks of the Dental Profession of many whose fitness may be questioned with propriety." It is suggested that the degree of Bachelor of Arts, or its equivalent, should be demanded, but then the stipulation is necessary "provided that it is obtained from a reputable university." Another important thing recommended is the extension of the school year to nine months, and the increase of the curriculum to four years. Owing to vacation, and other interruptions, it is possible

under the existing rules for a man to complete his education without having *actually* devoted more than twelve months to the study of dentistry.

There are many other subjects worthy of consideration in the Report before us which we hope to find an opportunity of placing before our readers. The earnest men who are in the fore-front of the battle of Professional progress in America will doubtless continue their efforts. Too little is known in other countries (where circumstances are so different) of the difficulties of the struggle, but our Trans-Atlantic brethren may rest assured that they have the sympathy of British practitioners, who (in spite of occasional misunderstandings) welcome good work for the advancement of the Profession wherever it may be done. We may perhaps just notice that in the discussion which followed the reading of the Report, Dr. ABBOTT referred to the existence of a "Diploma Mill" in Kansas City, legally chartered, and carrying on business in selling diplomas; Dr. OTTOFY was also of opinion that there might be others which escaped observation. These remarks may be of interest to our [correspondent who signs himself "Registered."

A NEW CURE FOR TOOTHACHE.—An inquest has been held as to the death of an old man [named Mockett, in Streatham workhouse. Whilst in the library he was seen to heat the poker in the fire and afterwards to place it in his mouth. He then put it back and next placed it against his neck. Another witness, John Green, who also saw the occurrence, said he "thought Mockett was suffering from toothache, and placed the red hot poker in his mouth to cure it." The deceased told the doctor that he had no recollection of what had taken place. Now if Green's testimony had included a statement that Mockett had told him he suffered from toothache, one could understand that the pain acting upon an unstable mind, led to the automatic actions described in the evidence. This automatism is a very peculiar fact, and

when it takes certain forms is liable to misconception, especially as it is difficult to understand. Sometimes there is no traceable motive as a starting point, like the supposed toothache above mentioned. This is seen in some cases of Kleptomania, where the individual collects "rubbish," or at least things which are useless to him. Certain formulated expressions of HERBERT SPENCER enable one, perhaps, to partially understand the peculiar mental condition. A very strong emotion makes such a demand upon the supply of nervous energy as to incapacitate the Intellect throughout much of its higher sphere, and we may possibly then do things unconsciously. "Memory, Reason, Feeling and Will simultaneously disappear in proportion as psychical changes become automatic," and although Mr. SPENCER is here explaining how certain acts may ultimately be performed without a demand being made upon the Intellect, the statement seems to bear upon the point we are considering.

A CASE OF FACIAL NEURALGIA.—Mr. Amoores has brought before the Odonto-Chirurgical Society of Scotland a case of Facial Neuralgia in which some relief was obtained by opening the Antrum, although this cavity was apparently free from disease. The patient, a lady of about thirty-six years of age, was of a neurotic type, and the pain was first localised in a left upper bicuspid. No conservative measures proving satisfactory, this tooth was finally removed. As so commonly happens in such cases, after a slight remission pain was referred to the other bicuspid, and this was also removed. A month later the canine followed. Two months afterwards the antrum was opened, and for eight months there was no return of the pain. Then the wound having granulated up, removal of the lateral gave relief for a month. Re-opening the antrum and insertion of a gold tube was successful for five months. Then the central required extraction; the left upper jaw was now edentulous and for

ten months, provided the tube was kept clear, there was no trouble. Finally, however, pain manifested itself on the right side of the face, concentrating in the right central which was extracted with the usual result. Trouble following in the lower jaw, Mr. Amoores removed all the remaining teeth. The antrum was allowed to close after six months, and with a complete denture the patient has for three months been free from trouble, with the exception of occasional very slight, wandering neuralgic pains.

THE GENERAL MEDICAL COUNCIL.—The next session of this important Body commences on the 28th inst., and one of the subjects to be dealt with is the report on the visitation of Examinations. It will be remembered that a Dental visitor has been appointed, and we hope his report will find a place with the others. We hear that Mr. TOMES was present at the April Examination at Glasgow, but perhaps there has not been time to make a return with respect to all the Licensing Bodies. On enquiring why candidates from England should choose other diplomas, we have been told that it is considered an advantage to be able to subdivide the subjects into two Examinations. Perhaps we may have an official expression of opinion upon this point. One of the members of the Council is about to resign his seat. Sir JOHN SIMON, who has been a Crown nominee since 1876, finds that the duties of the office overtax his strength. The vacancy thus caused would be acceptably filled by the appointment of a Dental Representative, and the Crown could not do better than nominate the gentleman who is now acting as Visitor to the Dental Examinations.

DEATH FROM SWALLOWING A HALFPENNY.—Dr. CROFTON ATKINS, the House Surgeon at the Children's Hospital at Brighton, records a very interesting case. A boy aged three

years swallowed a halfpenny on February 25th. There were no symptoms, and three days watching threw no further light on the case. On April 11th, the child was admitted with ulcerative stomatitis ; a few of the ulcers on the tongue were rather deep, there was no line on the gums, but there was some difficulty in taking solid food. A week later, when the ulcers were nearly healed, the patient suddenly one morning, brought up about two ounces of bright blood in two clots. At eight o'clock the same night, about six ounces appeared in the same manner, and the child died in a few minutes. A post-mortem examination disclosed a cavity in the œsophagus, containing the blackened coin, and the innominate artery, at its bifurcation, had opened into the same cavity through ulceration. *The Lancet* has recorded other cases. A young woman died with sudden sickness, and the consequent rupture of a blood vessel. She vomited a green corroded halfpenny supposed to have been swallowed eight years before. A boy, three years old, swallowed a bronze halfpenny in 1874, and brought it up unexpectedly, and without effort, in 1888. It was very thin and light and weighed only 57 grains instead of 86, as a new one would do.

A CEMENT FILLING MATERIAL.—Dr. Seikel, of San Francisco, makes a cement as follows :—Chemically pure zinc is made with a portion of oxide of zinc and oxydised by keeping it at a white heat for from six to ten hours. Then add phosphate of aluminium until the mixture is of the consistence of putty. Bake until it is fully fused and looks like porcelain ; then pulverise finely. This powder is to be used with a fluid composed of aluminium added to chemically pure glacial phosphoric acid and boiled down to the consistency of syrup.

ALUMINUM PLATES.—Dr. Sudduth's personal experience with aluminum as a base has been limited. In the college clinic it has given good satisfaction. It makes a good substitute for gold. He looks upon a cast aluminum plate as about

the ideal plate next to continuous gum or all porcelain. On account of the difficulty of casting the metal, except by experts, he doubts whether it will come into general use, unless a more satisfactory method for casting it than has yet been devised, is discovered. The patents that cover its use will also prevent its general adoption.

OPERATIVE DENTISTRY.—In the preparation of the cavity, Dr. Beadles says: Do not mutilate the teeth: nature knows best, and no man has yet improved upon her forms. Do not use rubber wedges for separating; don't use separators with too long a lever. All the space needed is room enough to polish the filling after its insertion, and if you have not this, wedge in a small piece of dry cotton, not too tight, and dismiss the patient until next day, when there will be ample room. Cut away all the enamel wall on the lingual side, exposing the entire cavity to the eye as reflected in the mirror. The shape of the cavity when ready for the reception of the gold should be that of a cube or square with rounded corners; sometimes a slight groove is required in the cervical wall for the reception of the first piece of gold which should be non-cohesive always. The sides should be as nearly parallel as possible, no undercuts, no pits or retaining points. Fill over full the groove mentioned, condense well over the cervical margin and burnish then and there. By doing this you have the margin safe and need not interfere with it again. From this point on, Dr. Beadles generally uses cohesive gold, rolling the gold between the fingers, annealing and cutting into pellets the desired size. Keep the proximal wall well burnished as you proceed, and you have finally only to polish with fine sand paper disk finishing with use of cuttle-fish.

For instruments Dr. Beadles requires only one small, straight, round pointed, steel-handled plugger, one flat-pointed and one or two right-angled, round-pointed, ebony-handled pluggers. When packing against the wall use smooth points, though serrated points may be used in the body of the filling

if desired. Don't pound and hammer the gold too much, which only weakens it, and when the cavity is filled *stop*. Don't build on gold simply to grind it off again. Using hand pressure, very frail walls can be built against with safety. Dr. Beadles affirmed his strong faith in hand pressure. More force can be used as the pressure is steady and gradual, and no mechanical invention can improve upon the human hand. In many cases a cavity in the anterior teeth can be nearly filled with cement, pressing annealed gold into the soft cement, waiting for the cement to harden before finishing the filling. Amalgam may also be found admirable in a few cases, facing the labial surface with gold.

THE USE OF BACTERIA.—Do not let us forget that Micro-organisms are not all bad. Dr. Gillespie says that although bacteria are of no aid to peptic digestion, and a hindrance to the pancreatic ferment if in quantity in the duodenum, they still are of great use in the small intestine, where they control putrefaction. This seems paradoxical, micro-organisms obstructing micro-organisms but assisting digestion. It seems, however, to be true. The organisms which most easily pass the searching examination of the stomach are those which give rise by their growth to the fatty acids, as they are the most resistant to the action of acids. Their products in the small intestine are sufficient to keep the contents of that viscus acid, and they thereby prevent or control putrefaction. In the large intestine the secretion is so alkaline that the putrefactive organisms reassert themselves. Increased putrefaction in the intestinal canal may therefore be due, in some cases, either to insufficient mortality among the putrefactive organisms in the stomach or to too great mortality among the acid-forming bacteria and yeasts.

DIATORIC TEETH.—Dr. H. C. Boyd describes his method of using the English pinless teeth, a tooth of very fine material, but a cheap tooth, because of having no platinum

pins. He uses gold wire in the holes of the teeth, allowing the ends to project sufficiently to solder on a continuous band, investing in plaster and asbestos for soldering. This makes a strong but not cumbersome piece, being waxed up, invested and vulcanized as usual.

THE SANITARY CONFERENCE AT MANCHESTER.—The first subject discussed was that of "Smoke Abatement," and the chairman, Sir Henry Roscoe, in introducing it, remarked that it was their province to deal not only with the smoke from manufacturing channels, but with that arising from ordinary household fires. Let them do what they would, however, even if they could get rid of smoke altogether, the fog and mist, which were quite unconnected with smoke, would still deprive these islands to a great extent of that sunshine enjoyed by so many other countries. Mr. A. E. Fletcher, Chief Inspector of Alkali Works, read a paper on "Air Pollution." He said he thought the difficulty would not be solved until compulsory powers were given in relation to coal smoke, similar to those given in the Alkali Acts in the matter of chemical works. In his own house he had a stove placed in the basement by means of which a stream of warmed air was introduced into the rooms, generally with such effect that he had been able almost to dispense with fires in them.

A JAW AFFECTION.—M. Dombrowsky has called attention to the illnesses peculiar to mother-of-pearl workers, which more often affect the lower jaw than the other bones of the human body. There are many of these cases in Professor Albert's wards at Vienna, and in a smaller proportion all over the world wherever mother-of-pearl is prepared. The skin and mucous membranes also present slight solutions of continuity, which are very painful. Good workshop sanitation, M. Dombrowsky declares, would greatly, if not entirely, remedy the evil.

Reviews.

Transactions of the American Dental Association at the Thirty-third and Thirty-fourth Annual Sessions. Philadelphia : The S. S. White Dental Manufacturing Co. 1895.

This volume contains the unpublished minutes of the session of 1893, and an account of the proceedings at the meeting last August under the presidency of Dr. Paterson. As usual, the work was arranged in Sections, and we seem to have already met with most of the papers and the discussions which have been published in the Dental Journals. Still it is convenient to have all the matter in one book, which is well printed and bound, and affords excellent reading. Opening it at random we notice a letter from the Secretary of one of the State Dental Associations announcing the expulsion of a member for violation of the Code of Ethics. Two pages further on we come upon a report as to the finances of the Chicago Dental Congress, from which it appears that there was a deficit of at least a thousand dollars. A proposal that the Association should contribute half this sum was carried. In Section I, Dr. St. G. Elliott described the Steam-Swager as recommended by Mr. W. R. Humby, but instead of its being introduced "within the last few months," it was, we believe, many years ago.

Formulaire de Médecine et de Chirurgie Dentaires par Noël H. Thompson, D.E.D.P. Paris : J. B. Baillière et Fils. 1895.

Anatomie, Physiologie, Pathologie et Thérapeutique Dentaires par le Docteur G. Hamonaide. Paris : J. B. Baillière et Fils. 1895.

These are two more of the publications which seem to be called into existence now that there are Candidates for the State Diploma in France. The first is a *resume* of notes collected by the author when he himself was preparing for Examination. The other little book contains all the questions put at the three examinations arranged according to the subjects, and the Examiners who asked them.

Catching's Compendium of Practical Dentistry for 1894.

As is now well known, this work, published annually, contains condensed accounts of the most useful information collected from the Dental Journals during the year. The matter is arranged under various headings; thus Operative Dentistry takes the first 60 pages, Prosthetic Dentistry the next 65, Crown and Bridge-work 40, and so on.

Abstracts of British & Foreign Journals.

PREPARATION OF CAVITIES FOR GOLD FILLINGS.

By Dr. F. E. HOWARD, of Buffalo.

Let us suppose, in all cases, that the rubber-dam is in position, and the surrounding surfaces dry.

We will first select a superior bicuspid, with a defective sulcus, that requires to be traced out and filled with gold. We will suppose that the decay has not extended very deeply, or to have involved any complications. The first step would be to introduce a small bur (my choice would be an inverted cone), and to force this well down to the bottom of the cavity, carry it forward or backward upon the floor, and bring it to the surface repeatedly in the endeavour to open a channel below the enamel-margin. Blow the *debris* from the cavity with an air-syringe, from time to time, so that the outlines may be distinctly seen. Now change the small bur for a cross-cut fissure bur of proper diameter, introduce this at the central portion, and with one or two sweeps the rough edges are removed and the general shape of the cavity is established.

We desire, in this instance, to have a generally flat or concave floor, with walls perpendicular to it. The extremity of the sulcus need not necessarily be of the same depth. One or two shallow grooves will ensure anchorage, and with the marginal edges bevelled the preparation is complete. In manipulating the fissure bur for counter-sinking, hold it at

an angle of about forty-five degrees from the position at first given. Then, by sweeping it around the edges at the same inclination, the margins are properly countersunk ; or this may be accomplished with finishing trimmers, files, etc. The cavity is now practically ready for the introduction of the filling.

To prepare an ordinary coronal cavity in an inferior first molar, open up the cavity in the same general manner as that just described, except that the burs are in the right angle attachment of the engine. In these teeth we usually have a central cavity, and radiating in four directions from that are fissures. By introducing the bur in the central cavity, it may be carried back at the depth of decay under the enamel and brought to the surface, repeating this until the channel is opened up as far as the extremity of the fissure. Returning to the central portion, the second fissure is opened up in the same manner, and this is continued until all are completed. The chip-blower must be in constant requisition to keep it clean. With a chisel and the cross-cut bur the angular portions are removed, the edges are countersunk, and the proper outlines given to the cavity. Again we have the flat or concave floor, the side walls perpendicular to it, and at one or two points slight undercuts to retain the filling. The extremity of the fissures need not be as deep as the central cavity, unless the decay is deep.

Should it occur that in the cavities described we have extensive decay, the procedure may be a little different. The first opening up of the cavity may, perhaps, be accomplished more successfully with chisels, by breaking down the weak surfaces of the enamel until the orifice is nearly as large as the interior. After giving desirable outlines to the cavity, the burs can then be successfully used. The same care of side walls, floors of the cavity, etc., should be observed that has already been recommended. We may find at one or two points deep undercuts, with strong overhanging enamel. It is not always necessary to cut this down, for the portion of the cavity beneath may be so lined with zinc phosphate as to give it complete support, and this will enable it to withstand all masticating force, and at the same time give better outlines to the cavity and filling.

In preparing labial cavities, a symmetrical outline may be obtained with a bur-wheel extended to the healthy enamel-margin. The floor should be fairly flat, with vertical

side walls. The marginal edges should be bevelled or countersunk, and retaining grooves cut at two or three points, or, if very extensive, the groove may extend nearly or quite around the cavity. If the filling is made to extend a little above the gingival margin, it is less likely that secondary decay will occur. In other words, a weak enamel gingival border is not advisable, and should be cut away to the cementum line. The same rule should be observed in preparing all buccal surface cavities.

In preparing approximal cavities of medium size in the superior central incisors, it is taken for granted that sufficient separation has been previously secured. With thin enamel-chisels, remove the angular part of the tooth bordering on the palatal surface to facilitate proper approach to the cavity so that it may be excavated and filled from that direction principally, as such operations not only preserve the appearance of the tooth more perfectly, but are more serviceable. When the general plane of this surface is given with the chisels, the next step should be to remove a portion of the decay with a spoon-shaped excavator, and two or three sweeps of the instrument will accomplish this. Next, with an emery or corundum strip, lubricated by drawing it across a paraffin block, dress down the margins until they are smooth and even. By further removal of decay, we are enabled to determine what will be the outlines of the cavity. If large, and the walls thin, it will be necessary to rely for the retention of the filling upon the cervical portion of the cavity exclusively.

With a pointed chisel, we may secure anchorage at the labio-cervical angle in the following manner: When we have decided upon the depth to go in this direction, a groove should extend from the extremity of this angle in the direction of the incisive edge, cut in the dentine, if possible. This should extend down as near the incisive edge as possible without weakening the centro-labial portion of the tooth. It is sometimes desirable to obtain further anchorage in the opposite direction. This may be secured with the chisel just described, aided by a bur and a hatchet excavator the blade of which is turned at an angle of forty-five degrees from the handle. We may cut from the central portion of the cervical wall in the direction of the palatal angle to the desired depth, a groove from the extremity of this angle upon the palatal

wall in the direction of the incisive edge. We now have a V-shaped anchorage in this locality, which, together with the one in the opposite direction, gives us retention for our filling that is entirely reliable, without an undercut at the incisive edge.

The Dental Cosmos.

WHEN AND HOW SHOULD TEETH BE CROWNED.

By D. M. GALLIE, D.D.S., Chicago.

The question, when shall we fill or crown a tooth, is an important one, requiring the best judgment. I believe it one of the most difficult questions that presents itself in our operating rooms. Still, I think, after careful study of such cases, if we would oftener decide to fill even at a little risk to the number of years the filling may last, it would be better. Should it subsequently fail, we still have a good foundation for a crown as a last resource. If successful, how gratifying to the operator; he has the satisfaction of retaining the natural expression nearer the natural colour and contour, which is oftentimes difficult when crowning is necessary. Now I believe a natural crown should be substituted by an artificial one when the original is so badly decayed that its frail walls cannot be strengthened sufficiently with cement to retain a permanent filling, when the tooth structure is so soft and frail that it will fracture under the pressure necessary to insert gold; when the teeth are so malformed and irregular that crowning will be more advantageous than regulating; when the tooth is badly discoloured, enamel checked, indicating that if bleached it would discolour again, and when a sufficient number of teeth are out to warrant the cutting down of two for the attachment of a bridge. By the latter I do not mean the cutting down of two good teeth for the sake of inserting a dummy between. That I consider an unwarrantable outrage. If the two teeth we wish for piers are decayed to much extent, discoloured and malformed, then I would cut them off and crown them

for the sake of those out, because the benefit would be greater than the sacrifice. But how often do we see a good right central and left lateral cut off for the sake of attaching the missing central with the result that all three look false; two have inflamed gums in many cases, and the centre one sets against the gum just as artificial and false-like as though it were attached to a plate. In such cases its proper attachment is to a plate instead of to the teeth on either side. It certainly is bad practice to grind down a first bicuspid, crown it, and attach a dummy cuspid or bicuspid to it. It is only a question of a few months or a year or so at the longest, when dummy, crown and root are useless, because the pressure on the dummy which forms a leverage is so great from mastication that it soon loosens and tips the attachment.

Should we crown two superior cuspids for the sake of attaching four incisors? Do we not find the majority of such bridges a failure? Is not the work of six cutting teeth too great for two roots? Are they not in most cases forced forward? Should all those molars with crowns badly decayed but not extending far under the gum, be crowned? I think not. Inlays should be inserted in such cases, either of gold or of porcelain, which would look better, feel more comfortable, and in every way be more satisfactory than the ordinary gold crown.

After the important question of when should teeth be crowned is answered, the next is, how should we crown them? The first answer should be to devitalize the pulp if it is not already destroyed, for, I do not believe there is a case when crowning is necessary that warrants the adjusting of such without first devitalizing the pulp. The operation will eventually be a failure if the pulp is left to be irritated and inflamed from the grinding. It is barbarous to a patient to grind down and denude a tooth of its entire protection, which is absolutely necessary if you desire to prepare it properly. The majority of all teeth, after the enamel is removed, are still larger at the cutting edge, or midway between the occluding surface and neck than they are at the neck. To have a perfect fitting band or collar, it is necessary to have the neck of the tooth slightly larger than any part below it. To do this a great deal of grinding is necessary; excruciating pain is experienced by the patient; the ends of the dental tubuli are ground off, and the dental fibril

left bare. Irritation is so great by this procedure that the pulp becomes greatly inflamed, and as a last blow to an already injured member, we cover it all with a gold crown, which, if fitted properly, will not admit of sufficient cement between it and the tooth to protect it against the action of heat and cold. The result is that in a great majority of cases and in a short time the pulp dies and we have a bad abscess on our hands. Now, after the tooth is insensible to pain, we prepare it according to the crown we wish to adjust. In this connection, I will say that a gold shell crown should never be placed over the anterior teeth. In fact, there are few cases of bicuspid crowning that demand an all gold crown. But we see every day people masquerading with gold teeth in the front of their mouths. The patient who insists on such work is to be pitied ; she lacks taste and good sense, but the dentist who inveigles patients into wearing such should be prosecuted for malpractice.

All anterior crowns should have porcelain faces and all bicuspid the same, wherever possible. The argument that if all gold bicuspid crowns are used, most of the tooth structure can be left to strengthen the case, does not hold against porcelain-faced bicuspid. If necessary, only the buccal surface need be ground off sufficient to permit the facing to rest against it after being soldered or attached to the band. The buccal or labial surface of all roots or teeth that are to be crowned with gold and porcelain should be ground slightly under the gum margin, so that when the band is adjusted the slight overhanging gum will reach the porcelain facing. This root or tooth should be slightly tapered from its neck towards the crown end. The measuring wire should be adjusted slightly below the fullest circumference of the neck, and the band then cut to this size. This will cause the band to be a tight fit, but a very slight tap will send it to place. Trimming the root and fitting the band in this way will allow the gum to grow around the crown without any inflamed or irritated appearance, because the gold you use does not impinge upon or stretch the gums, for it is no greater in circumference than the original investment of enamel. If you intend adjusting the ordinary Richmond crown, the facing should be ground so that when tipped at the cutting edge, the gold tip will be invisible. The same should be applied to bicuspid facings. This can be easily

done by grinding the facing bevelled at the cutting edge, backed up with pure gold, thirty-one guage, well burnished over the bevel. If this is done the crown is greatly strengthened and not at the expense of artistic appearance.

The Dental Review.

THE RELATIVE PENETRATING POWER OF COAGULANTS.

By JAMES TRUMAN, Philadelphia.

The question of the proper material for filling root-canals has been a subject of discussion and experiment for the past half century, or since Maynard introduced the method of filling these canals with gold. In connection with this the consideration of certain agents has led to a decided antagonism in regard to the diffusibility, coagulation, and antiseptic properties and values to be placed upon these in the general treatment of the central pulp-canal and the tubuli branching from this throughout the dentine.

It has been clearly evident that the inner tubular portion, fibres of Tomes and Neumann sheaths, form no insignificant part of the organic matter of the tooth substance, and that death of the central organ means necessarily the death of the whole and subsequent decomposition of this tissue, or at least the central protoplasmic portion, the sheaths being almost indestructible. Hence the treatment of the pulp canal, however perfectly accomplished, must fail to reach the microscopic elements in the tubes, and the decomposition taking place therein results in the discolouration of the entire tooth, and may act disastrously by septic emanations upon the vitality of the entire structure. The importance of this has not been lost sight of by intelligent operators, but the difficulties of manipulation have been serious. It has been plain that but two methods could be relied upon to overcome the difficulty, the property of coagulation and the diffusibility of various essential oils, aided by osmotic action. Both methods have had decided advocacy and it is very probable that both have a positive value, the extent of which has as yet to be determined, for, as far as I am aware, the relative values of

the systems of treatment have not been settled with satisfactory experimentation, or, if so, have not been divulged in the papers upon this subject; all the points defended by the writers seem almost entirely to be based on assumptions, imperfect experiments, or upon clinical observations.

The difficulties surrounding the subject, and the many errors of observation to which experimentation in this direction is liable, has led to criticism, and have thrown a shadow of doubt upon those made by several observers.

It is not the purpose of this article to enter into any contention with the two schools of thought on this subject, but rather to show, if it be possible, that the arguments maintained with so much vigour and pertinacity that coagulation furnishes its own barrier to diffusion is an error of observation. Further, it is desired to demonstrate that the various coagulants have relative degrees of value. This has seemed to possess some degree of importance in other directions than that of coagulation of albuminoid material in dentine. The knowledge on this subject seems somewhat crude. The general idea being to rest satisfied with the fact whether a certain agent will coagulate or not, and in many instances writers have ascribed this property to agents that do not possess it. There seems, therefore, good reason for an attempt to settle several questions by careful experiment.

The direction of this present paper is only incidentally aimed as answer to the assertion that coagulants act as a bar to their own diffusion, for it has to do principally with the proposition, to what extent can this coagulation be relied upon to effect satisfactory results?

The position taken by myself in 1889, that coagulants placed in the central canal would permeate the tubuli and coagulate the contents, remains true to-day, as the experiments in capillary tubes will demonstrate, and as was previously also demonstrated by Dr. Kirk, reported in the *Dental Cosmos*. It is, therefore, useless to combat the ideas entertained in the quotations of an opposing character, as they have no force. The question might be left where it was placed by those experiments, but it seemed to me there was something more to be said on this question not entered into by Dr. Kirk. Some of these points were taken up seven years ago by myself, but dropped for a more favourable opportunity to continue them. My intention was to endeavor

our to show that coagulants would penetrate tubes of minutest character possible to be handled satisfactorily, and that this penetration was independent of circulation. My earlier investigations seemed to warrant this belief. Diffusion is recognised in the living tooth as performing an important and continuous part in its nutrition. It seemed certain, as the tubulated portion of the dentine invariably imbibed finely divided coloured matter in solution, that therefore it must take up any other fluid, if of equal solubility, with the same facility. This beyond question is true. The main difficulty here being to demonstrate that the coagulation was continuous without the aid of circulation.

The early experiments abundantly proved this to be true, but they were carried on, at the same time, with difficulty. The effort was, as before stated, to find results in tubes not exceeding a millimetre in diameter, and if coagulation occurred it must be through absolute contact of the agent with the albumen or gelatin used in the experiment. It was necessary to fill the minute tubes with the albumen and then seal the ends. Both processes were accomplished readily by nearly filling the tubes and then quickly melting the ends in a Bunsen burner. This proved entirely satisfactory. It was found, however, that the albumen in the tubes dried and contracted upon itself, leaving spaces. To meet this difficulty the albumen was combined with twenty per cent. of glycerin. This served an excellent purpose, and proved no interference with coagulation either in large or small tubes, with all the agents known to be positive coagulants, with one exception. It was found that mercuric chloride had little or no effect apparently on albumen and glycerin. This was repeated a number of times. It was then applied to albumen without glycerin, and coagulation was immediate. It was found, however, that glycerin simply delayed coagulation, for in the course of a few days the effect of the mercuric chloride was plainly visible in flocculent masses. This fact necessitated a repetition of all the experiments to determine their correctness. It was found that mercuric chloride was the principle one of the series seriously antagonized by the glycerin.

These experiments have occupied several months, as the conclusions were not arrived at until constant repetitions, under varying conditions, had demonstrated their correctness.

Whenever possible the effort was made to have coagulation proceed in opposition to gravity. What does the work as a

whole teach? 1. That coagulants do not prevent by their own action the diffusion throughout the entire tube.

2. That the penetrating power of such agents as creosote, carbolic acid, and zinc chloride, those most frequently used, varies materially. That creosote is a very poor coagulant when compared with carbolic acid, and the latter, for this purpose, is not to be compared with zinc chloride or silver nitrate.

3. That in proportion to the coagulating power of the agent will be its penetrating force independent of gravitation.

The oxychloride of zinc, of the same consistency used in filling pulp canals, was placed in the funnel portion of the small tube. It soon hardened, but the coagulating process was marked upon the albumen. It began immediately and has continued without interruption to the present time. The line of demarcation between the oxychloride and the coagulation is distinctly shown. This, probably, is one of the most satisfactory of the tests, as it abundantly proves that contact with albumen is all that is necessary to produce coagulation with zinc chloride, and if this be possible out of the mouth, how much greater must it be under more favourable conditions in the tooth.

Caustic potash was experimented upon not as a coagulant, but to observe the effect on albumen and gelatin. Though several tests were made, no visible results were produced, though this does not antagonize the recognized quality of this agent as one of the most deeply penetrating and uncontrollable caustics used on the tissues.

The action of nitrate of silver in repeated tests was rather a surprise. It has generally been regarded as a superficial coagulant, but in every instance it has proved deeply penetrating, and coagulating with rapidity and certainty, very nearly equal to zinc chloride. This fact assumes some importance in connection with the use of this agent in teeth. Its rapid penetration raises the question, Can we use it without danger to the pulp in posterior teeth as has been recommended? At present I am not prepared to answer this question, but it seems as though a risk equal to that assumed in the use of zinc chloride is taken when placed in children's teeth for the prevention of caries.

The experiments were extended to the penetration of the tooth structure by a number of coagulating agents. A large

number of teeth were kept under the action of these, the pulp-canals being first slightly enlarged and filled with the agent daily. The result has not been entirely satisfactory, microscopic examination shows decided action throughout the dentine, the tubes, in several sections being nearly obliterated and indicated only by fine lines ; but while this demonstrates a positive change in the organic contents of the tubes, it does not absolutely show that this has been caused by the coagulants. Thus far I have been unable to carry the stain given the agent along with the coagulation. Silver nitrate in several sections penetrated in seven days two-thirds the length of the tubes, but the extreme discolouration made it impossible to follow the individual tubes except at the extreme limit of colouration. Tests were made with a variety of stains, but with no result, the coagulation invariably separating from the stain. When the colour can be carried along with the coagulation, it will visually show what may be regarded as absolutely true, that the coagulant is carried in the dentinal tubes as effectually as in those exhibited.

In the specimens prepared for the microscope, the evidence is positive to the trained eye that every tube is filled with coagulated organic matter, and this has been so frequently repeated, and with precisely the same results, that I have no hesitation in accepting it as a fact. I failed, however, to observe any change in the cementum, and I am, therefore, led to doubt the possibility of any coagulating effect in that tissue by any of the agents used.

An attempt was made to verify Dr. Kirk's experiment of cementing a tube in a tooth, sealing the foramen, and then filling the tube with an active coagulant, as zinc chloride. Six perfectly fresh teeth were taken, tubes cemented, and foramen closed. The tubes were of varying length, the fluid in them ranging from a column of 7 to 18 centimetres. These were placed in a second tube filled with egg albumen. The result in four was that coagulation began after several hours at points indicating leakage. One of these was removed, the leak covered with paraffin, and reinserted. This has remained imbedded in the albumen for over a month without any result. In two cases the leak evidently was not through defective manipulation, but appeared to be from an invisible crack in the enamel and at the bifurcation of molar roots. The two specimens exhibited will, I think, demonstrate the conclusions arrived at by microscopic tests, that zinc chloride,

the agent used, cannot penetrate through the cemental tissue. If this cannot be done by the force of the column of fluid, it certainly cannot by diffusion. The error, it seems to me, of Dr. Kirk's experiment, lies in the fact that allowance was not made for leakage. It is well known to all histological workers that teeth may be more or less penetrated by cracks. These furnish a clear passage for any fluid forced into the tooth. Fresh teeth are not so liable to this defect, demonstrated by the specimens exhibited.

In the paragraph quoted from a portion of my remarks in 1889, I stated my faith in coagulation as a remedy for discolouration and an effectual barrier to the ingress of micro-organisms into the dentinal tubes. I am still of the same opinion, the only modification I would make of these views then expressed would be that I fear the possibility of the action of the zinc chloride upon the pericementum through its penetrating power, passing out through the foraminæ, if more than one exists. My observations, as heretofore stated, do not show that the use is at all dangerous if care be taken to close the upper third of the canals thoroughly before placing the coagulant in the tooth. Clinically, I have observed in one case only an action upon the pericementum, which I have been led to attribute to the zinc chloride passing through the foramen. The large clinical experience in filling root-canals with oxychloride of zinc, now covering many years and a large number of practitioners, seems to show that it can be used without risk, provided proper precautions be taken.

In the use of zinc chloride as an obtundent of sensitive dentine there cannot be two opinions. The experiments demonstrate, beyond cavil, that this agent is exceedingly dangerous to the life of the pulp, and should be abandoned for that purpose.

While it is recognized that the experiments are by means exhaustive, I regard them as demonstrating the incorrectness of the views quoted, and must further regard them as placing the question on an intelligent basis, and perhaps adding something to our knowledge as to the relative penetrating power of coagulants.

The International Dental Journal.

THE ETIOLOGICAL CLASSIFICATION OF
PYORRHEA ALVEOLARIS.

By Dr. M. L. RHEIN.

Various forms of pericemental inflammation with purulent discharge at the gingival border have afforded points of dispute for years. The etiology, pathology and treatment of this disorder will furnish a field for *battle royal* at our meetings, until science shall have vanquished this destroyer of the dental organs. The names given to this disease are as varied as its manifestations.

The name "*Rigg's Disease*" was bestowed upon it in honour of the man who first called the attention of the profession to the feasibility of combatting its ravages.

The name *Pyorrhea Alveolaris* has a strong foothold, and it would be as easy to eliminate the word *dyspepsia* from the nomenclature of the medical profession as *pyorrhea alveolaris* from that of dentistry. But although this name only expresses the clinical feature of a flow of pus from the alveolus at the gingival border, it has been used indiscriminately to express the most severe and complicated forms of the disease in question as well as the simple and uncomplicated.

To obviate this difficulty would be to remove one source of contention and leave time for the investigation of more important matters.

Dr. Rhein submitted a plan of etiological classification of various phases of the disease, retaining the name *Pyorrhea Alveolaris* as generally descriptive of any condition where pus flows from the alveolar borders, but classifying the various forms of the disease. He would first make the two grand divisions of—

I. *Pyorrhea Simplex*.

II. *Pyorrhea Complex*.

I. *Pyorrhea Simplex* would include all cases of purely local origin and caused by local means. Lack of hygienic conditions, unsanitary conditions are at all times the sole causes of a purulent discharge. This is purely local, and yields to local treatment. In other cases malnutrition—a poverty of life-endowing corpuscles plays an important role.

II. *Pyorrhea Complex*, by different writers called "true pyorrhea," phagadenic pericementitis," "hæmatogenic calcic

pericementitis," presenting numerous peculiar or obscure clinical features.

To the numerous subdivisions of this grand division, with its complex varieties, Dr. Rhein proposes to add a modifying word which shall indicate the etiology of each case after careful diagnosis.

Class A would include cases complicated with or due to gout, diabetes, chronic rheumatism, Bright's disease, scurvy, chlorosis, anæmia, lucæmia, pregnancy.

B. Cases having their inception during attacks of acute or infectious diseases, neurasthenia, hysteria.

D. From the toxic effects of drugs as mercury, lead, iodine.

E. *Pyorrhea sequentia*, arising after the prime cause of diseases has been removed.

For each of these classes a compound term, such as "gouty pyorrhea," "tuberculous pyorrhea," etc., would be clearly understood, indicating the pathology and treatment of the case in concise manner without the interjection of any irrelevant matter.

The Ohio Dental Journal.

FACIAL NEURALGIA.

By M. H. CRYER, M.D., D.D.S., Philadelphia.

The diagnosis of facial neuralgia and locating the cause are of great importance, and among the most difficult problems the surgeon has to solve. Diagnosis by exclusion, or in other words ascertaining what a thing is by eliminating what it is not, is the best method. As neuralgia may be confounded with other diseases, each of these must first be excluded. For instance, the possibility of its being a case of neuritis. In determining the nature of this case, all signs of inflammation must be considered, and if not found, that disease can generally be excluded. After convincing oneself that the case is one of neuralgia, determining the cause is the next step, and here also the process of exclusion should be followed. It is my opinion that the peripheries of the fifth nerve should be exhaustively examined. The state of the

mouth should be in the charge of a competent dentist, and I mean by this word all that is properly included in the term stomatologist; each tooth examined for hypersensitive dentine, superficial and deep decay, exposed pulps, fillings that are irritating to the pulp, pulps in any stage of inflammation, whether they be in sound or decayed teeth, or in one that has been filled. The remains of roots, and whether a fistula opens to them or the gum tissue has grown over them; normal and even supernumerary teeth that have not been erupted must be determined. Three teeth, a cuspid, central, and a lateral incisor, were found on opening an antrum in search for a cause of neuralgia; the three perfect crowns were protruding into the antrum; while the imperfect roots were embedded in the anterior portion of the inner walls. After their extraction the neuralgia ceased. Sometimes teeth in apparently healthy condition may be dead and have caused abscesses that are no longer connected with them, some of which may have opened into the antrum, the pus burrowing under the muco-periosteum of that cavity, elevating it until it closes the opening between the antrum and nasal cavity. This is one source of neuralgia. Cicatricial tissue must also be looked upon with suspicion. In fact, the mouth and its surroundings must be put in such condition that it can be excluded as the cause of the disease under consideration.

An examination should be made over the entire region of the branches of the nerves. It should be ascertained if the patient has at any time received injury of any kind in or about the head or face. This causes neuralgia not infrequently by having some of the nerve-filaments caught in a cicatrix, or they may be compressed against bony structure. Failing to localize an injury, the constitutional diseases should next be surveyed,—gout, anæmia, rheumatism, malaria, syphilis, catarrh, etc., any and all of which cause neuralgia. Gout, and rheumatism, however, seldom produce neuralgia of the head, but malaria, syphilis, and catarrh are common causes. If the patient is suffering from any of these complaints, it should be treated and cured as a step in the diagnosis.

Not until all external and constitutional causes of neuralgia have been excluded is the surgeon justified in opening the face or brain-case for a resection or the removal of the Gasserian ganglion. A tendency of the general surgeon of

to-day is to disregard the importance of thorough examination and correction of the discoverable diseases, especially those of the mouth, and he may, in consequence, perform an extensive operation regardless of disfigurement or the risk of losing his patient.

American Journal of Dental Science.

Reports of Societies.

THE GLASGOW DENTAL STUDENTS' SOCIETY.

The last meeting of the Session was held on Wednesday, 1st May. The President, Dr. McMillan, gave a very interesting paper on "Diseases of the Mouth." Before the paper was given, a letter from Messrs. Ash and Sons was read, in which they presented a number of volumes to the Students' Library, for which a hearty vote of thanks was given.

Dental News.

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

At the April sittings of the Dental Board, the following candidates passed the respective examinations :—

First Examination.—D. Daniel Davies, Liverpool ; George P. Warlow, Birkenhead.

Final Examination (and admitted Licentiates in Dental Surgery).—George Henry Bowden, Bristol ; Francis H. J. Carter-Braine, London ; James Waddell Dallachy, Glasgow ; John Colquhoun Gardner, Glasgow ; John Wm. Alexander M'Gowan, Glasgow : Wright Sunderland, London.

VACANCY.

Victoria Dental Hospital, of Manchester. The post of Tutor is vacant. Applications to be made to the Dean on or before June 15th.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents]

A DEGREE SINE CURRICULO.

To the Editor of the "British Journal of Dental Science."

SIR,—I notice a paragraph in the last issue of the Journal headed "A Fireside Curriculum," in which it is stated that a dental degree of the U. S. A. may be entered for by passing the final examination without a curriculum. Are there really such opportunities, and if so, can you or some reader say whereabouts in the United States we should go?

Yours truly,

REGISTERED.

* * We quoted from a letter written to *The Chemist and Druggist*, and have no personal knowledge as to requirements of the American Colleges other than that gained from the public announcements. We are not inclined to believe the statement except in connection with some unknown "Diploma Mill." See our remarks in another place.—Ed.]

LISTERINE—A CORRECTION.

To the Editor of "The British Journal of Dental Science."

Dear Sir,—I shall feel greatly obliged if you will kindly insert this correction (together with the few accompanying remarks I have made) of what I am reported to have said in the discussion on Mr. T. Reece's Paper on "Dental Caries," read on April 5th last, before the Students' Society of the National Dental Hospital. Owing to an error on the part of the Secretary of the Society, it was given forth in the report of the Meeting, that I advocated the use of *Glycerine* on cotton wool, as a method of filling the roots of pulpless teeth. This absurd mistake was doubtless owing to the similarity in sound of the words *Glycerine* and *Listerine*, which latter was the preparation I mentioned, and then hardly as a root *filling*, but more in the aspect of a disinfectant, prior to sealing the root canals permanently. As the error has been corrected in the Minutes of the Society, I shall esteem it a favour, if you can spare space in your valuable Journal for this communication; as in your issue of May 1st, it has been reproduced from the Minutes. While on the subject of *Listerine*, I should like to take the opportunity of mentioning one or two points in its favour, concerning its usefulness to the Dental Surgeon, and which will perhaps be the means of bringing it more prominently before the Profession, in the light of an extremely good *Antiseptic* and *Disinfectant*, and one that will doubtless prove itself very efficient. Although, up to the present time, I have not had much opportunity to judge of its effects (having only used it for about three months) on dead teeth, I may say I have had very good results follow its application, which is as usual in these cases, viz., thorough cleansing of the canals

hot air, &c., and the *Listerine* pumped in, and in its turn volatilised, and further treatment as indicated. Up to date I have had no bad cases following this treatment.

Listerine is I find an extremely good mouth wash in cases of foetid odour, spongy gums, stomatitis, and generally bad conditions of the oral cavity, and it may be remarked that Professor Miller of Berlin, speaks very highly of it in this respect. I also use it as a mouth wash after tooth extraction, with very good results, and very extensively to wash out cavities before inserting a permanent filling, either as a dressing on cotton wool, or merely flooding the cavity with it, (using sedatives previously, if there be pain). It exercises a very beneficial effect on cavities in which there is a great deal of septic and softened dentine, with the carious cervical edge of the cavity up under the gum, by sealing a little of it in temporarily for a day or so, before proceeding to plug permanently. It is especially, however, in cases of pulpless teeth, that I lay stress upon its use, as it may prove a very valuable addition to our remedies for such cases, consisting as it does of a combination of some more powerful essential oils, such as eucalyptus, thyme, gaultheria, menthol, etc. It is used largely in general surgery, and is therefore, I think, deserving of a trial in our special branch, it being very agreeable to both patient and operator, a remark which cannot always be applied to some of the drugs now in use, and seems to me to be indicated as a general antiseptic and disinfectant in Dental Surgery. Thanking you in anticipation for correcting the above error, in reporting my remarks, and trusting that older brother practitioners may have discovered the utility of *Listerine* in their daily practice.

I am,

Faithfully Yours,

ARNOLD PRAGER, L.D.S., Eng.

Dental Hospital Reports.

WORK DONE at the Victoria Dental Hospital of Manchester,
during the month of April, 1895.

Number of Patients attended	771
Number of Extractions	589
Number of Extractions under Anaesthetics	144
Gold Stoppings	54
Other Stoppings	67
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	210
Crowns	8
Irregularities	10
Inlays	3
Total	1085

J. BUTTERWORTH, *House Dental Surgeon.*

British Journal of Dental Science.

No. 657. LONDON, JUNE 1, 1895. Vol. XXXVIII.

STUDIES IN SUPERIOR PROTRUSION.*

By GEORGE G. CAMPION, L.D.S., Eng.

In opening a discussion on protrusion before this Society in March, 1892, Mr. Hepburn described with some minuteness, and I believe for the first time, a distinct variety of this deformity; a variety which cannot be attributed "to mechanical influences, such as thumb-sucking, or the impingement of antagonising teeth," and where "the cutting edges of the lower incisors exist, as it were, in space, pointing upwards towards the palatal vault, and free from contact with any of the super-existing structures." He also spoke of this distinctive protrusion as being associated with an increase of bone in the premaxillary region, and elsewhere has expressed the opinion that it may, at any rate in some cases, be caused by a continued growth of the premaxillary bone as distinct from the maxilla. Now in these cases Mr. Hepburn described the upper canines as being erupted in a large number of typical cases in normal antagonism with their opponents, but, judging from the examination of a considerable number of specimens, I am inclined to think that these teeth, although often in antagonism with their opponents, are not in "normal" antagonism.

* Read before the Odontological Society of Great Britain.

The figure I show illustrates the general appearance presented in this form of protrusion, the uniform extension of the upper arch, the wide space between the lower incisors and the upper gum, the upper canines almost, but in this case not quite in contact with their opponents, but biting, however, not as they should behind, but in front, of them ; and this abnormal bite extends to the bicuspid and molar region as well, the upper bicuspids articulating in front instead of behind their opponents, and the upper molars being to the same extent in advance of the lowers. There is, of course, nothing original in this observation. Kingsley, in his work on oral deformities, describes and figures such a case, and shows the results obtained in treatment by jumping the bite. There are also one or two other similar cases on record which have been successfully treated in the same way, but these have, I fancy, been regarded by practitioners generally as rather in the nature of rarities, whereas I believe that an examination of a large collection of models of protrusion would show them to be in reality common. One of the two models which Mr. Hepburn figured in the Society's Transactions showed this mal-occlusion in the masticating region, though Mr. Hepburn did not himself call special attention to it.

In examining during the last twelve or eighteen months such models of this deformity as I have happened to come across, and noticing such cases as from time to time presented themselves in patients, I obtained a list of thirty-nine cases of different kinds and degrees of protrusion, and in only four of these, or just over 10 per cent., was the molar occlusion normal on both sides of the mouth, while in twenty-four cases, or about 61 per cent., the lower teeth articulated the breadth of a bicuspid behind their normal position. In other cases the articulation varied on the right and left sides of the mouth

and in some the molars and bicuspid met cusp to cusp, or half the breadth of a bicuspid posterior to the normal bite. Tabulating the cases and briefly expressing these two positions as Back and Half Back, we have :—

LEFT.		RIGHT.		
N.	...	N.	...	4 Cases.
B.	...	B	...	24 „
N.	...	H.B.	...	2 „
B.	...	H.B.	...	5 „
H.B.	...	B.	...	1 „
H.B.	...	H.B.	...	1 „
—	...	H.B.	...	1 „
H.B.	...	—	...	1 „

This list, however, probably exaggerates the number of those with Back occlusion on both sides, because in several of the models teeth had been lost, and the position of the others consequently deranged ; and I have classed as Back some in which perhaps a lower second bicuspid has been removed, and the molar come forward into a more normal position if the first bicuspid and canine showed themselves distinctly behind instead of in front of their opponents. It would be necessary to obtain particulars of a large number of cases in which no teeth had been removed in order to estimate with any accuracy the proportion which show this mal-occlusion in the masticating region.

I was at the time a good deal surprised at this result ; if not quite exact, the figures at any rate show that in a large proportion of cases we have to deal not merely with an abnormality of a few of the anterior teeth but with a deranged articulation of the entire arches ; a derangement which, whatever its origin and causes, is established early in the life of

the child, for it is to be seen not only in the permanent but in the temporary teeth.

I found, too, that this mal-occlusion is by no means confined to cases of protrusion, but exists also in many cases of general crowding of the upper teeth, of overlapping centrals, instanding or outstanding laterals, and projecting canines, and also that it is possible to find quite a number of cases in which children who are brought to us for consultation on account of general crowding of the upper teeth, present also the condition of protrusion of the upper arch in relation to the lower, though this is subordinate to, and masked by, the general irregularity. They in fact present us with transitional forms between the ordinary cases of protrusion on the one hand, and general crowding on the other. To this point I shall recur later.

It is not easy to see the exact significance of this derangement, or the way in which it is brought about. At first sight it seems as if it might be occasioned in one of three ways: either (1) a bodily protrusion of the maxilla, or (2) a want of development of the mandible, or (3) posterior displacement of the latter bone, if it be of normal size. Kingsley seems to hold that the last of these possible conditions is generally the explanation, as this explains both the ease with which in some cases he claims that the bite can be jumped, and also the receding chin which is so often associated with the protrusion. But this view is inadequate to explain the different conditions met with. It takes no account of the development of the mental prominence of the mandible which is an all-important factor in determining the projection of the chin, and it fails to account also for those cases where, with a chin of normal projection and a mandible of apparently normal size, we still get the back occlusion of the lower molars. My impression is that in some cases we have to do with a defective develop-

ment of the mandible, and in others with a bodily protrusion of the maxilla, but the point is a very difficult one to settle. It cannot be decided by absolute measurements of the mandible, for at the age of 12 or 14 the angle of this bone is not sufficiently developed to afford any point definite enough to measure from, and in addition the determination of the average size of this bone at different ages, and in the different sexes, would present too many fallacies to make the method of any use where such comparatively small differences are of importance.

But it occurred to me that more definite results might be obtained by some proportional measurements made in a similar way to that adopted by anthropologists in determining the projection of the dental arch in relation to the rest of the face by means of the gnathic index.*

On twelve children of ages varying from 12 to 15 I tried computing this index by measurements taken from the auricula point (centre of external auditory meatus). The indices thus obtained varied from 94 to 104, the average being 99.4, while in three cases of protrusion the indices were 100, 101.8 and 103.6. But even if it could be shown that in a number of cases of protrusion the indices were considerably higher than in a similar number of normal cases, this fact would be of little value in attempting to determine whether the maxillæ in the cases of protrusion were abnormally projecting, because as will be shown presently, the form of the entire arch is

* The gnathic or alveolar index is ascertained in the following way: The distance from the Basion (the centre of the anterior margin of the foramen magnum) to the Alveolar Point (the point on the edge of the external plate of the alveolus between the upper central incisors) is multiplied by 100 and divided by the distance from the Basion to the Nasion (centre of naso-frontal suture), thus:

$$\frac{\text{Basialveolar length} \times 100}{\text{Basinasal length}} = \text{Gnathic Index.}$$

altered in such cases, and also the position of the alveolar point in relation to the rest of the maxilla.

Another feature worthy of notice in these cases, and which has never, so far as I am aware, been carefully studied, is the breadth of the dental arch and its relation to the length. In a paper read before the Society many years ago, on an attempted classification of irregularities of teeth, Mr. Oakley Coles, adapting two terms used by anthropologists in cranial measurements, proposed the words brachoid and dolichoid to denote respectively arches which were above the average measurements in breadth and length; but his application of these terms was based on no absolute measurements of the arch, nor as obtains in their use by anthropologists, on any relation between the measurements of length and breadth. So applied, their use was arbitrary and impossible of exact application, and made no allowance for necessary variations in the absolute size of arches which, *cæteris paribus*, will obviously depend on the absolute size of the teeth. The terms however, seem convenient ones for adoption in any discriminating classification of the different forms of arches, if their application be based on relative measurements, for this would allow for any variation in the absolute size of the teeth; but the application of these terms could be only made after a careful and extended study and measurement of a large number of fairly normal arches. I have attempted to apply this method of relative measurement to the arches in cases of protrusion for comparison with normal dentures, and the result is striking and suggests some interesting conclusions.

Three years ago, in studying a series of models in the museum of the College of Surgeons, to ascertain their bearing on the accepted views as to the development of the jaws, Mr. Tomes took the following as fixed points for measurement: for length, "the distance from the middle of the back edge of the grinding surface of the second temporary molar to the

centre of the back of the neck of the central incisor of the same side, at the point where the gum joins it ;” for width: “the distance between the middles of the grinding surfaces of the second temporary upper molars, and afterwards of the second upper bicuspid.” Now these points, though doubtless best suited to the purpose Mr. Tomes then had in view, are not so suitable in studying protrusion. They would, for example, not record any protrusion resulting from the inclination forwards of the incisors. So I took instead—for length, the distance from the mesial extremity of the cutting edge of the central incisor to the centre of the posterior border of the masticating surface of the six-year molar. The mean of the measurements on each side was taken as the length of the arch, there being often a slight discrepancy between the measurements of the two sides. For breadth I took the measurement across the arch between the most prominent points on the labial surfaces of the first bicuspid or first temporary molars. The first bicuspid was chosen for the point of measurement of breadth, as being about midway between the extremities of length, and also because the breadth varies more in the bicuspid than in the molar region, and it was precisely this variation which I wished to study. And taking extreme points for length measurement, it seemed well to take them also in determining the breadth, and so the labial surfaces were fixed on instead of the centres of the masticating surfaces which were chosen by Mr. Tomes. The length and breadth being determined, their relation was calculated in the same way as the cephalic index.

$$\frac{\text{Breadth} \times 100}{\text{Length}} = \text{Breadth index of the arch.}$$

Determining in this way the relative length and breadth of a certain number of fairly normal arches, I found the index to range approximately from 105 to 115. As compared with

these I found in 28 cases, showing different degrees of protrusion, that the indices varied from 84 to 102. Four only had an index of 100 or over, *i.e.*, had almost normal arches, and all four presented the posterior occlusion of the lower molars. In three of them the protrusion was more than accounted for by this mal-occlusion, and in the fourth, by placing the models in their proper articulation, the protrusion was rendered comparatively slight—so slight as to be readily cured by pressing the incisors back till the slight spaces between them should be obliterated; this case being one in which the protrusion caused by the posterior occlusion of the lower teeth had been exaggerated by thumb-sucking.

In the other cases the index averaged about 93 or 94, showing arches relatively narrow. This, of course, was to be expected. A moment's consideration will make it clear that an arch with protruded incisors, even if of normal width, in absolute measurement must appear narrow in relation to its length. But in these cases of protrusion we find an absolute as well as relative diminution of width. In twelve cases of normal arches the average width was 46.9 mm., and in twenty-six cases of protrusion only 41.3 mm., the average width of the normal arches thus exceeding that of the protruded arches by 5.6 mm.

Now this is very interesting and suggestive, although the number of normal arches measured is too small to eliminate the possible fallacy arising from the different sizes of teeth in the different arches. But it certainly suggests that there may be some causal relation between the narrowness of the protruded arches, and their length. It is one thing, however, to show a relative or even absolute diminution of the width of protruded arches, and quite another to prove a causal nexus between the narrowness and the protrusion. The argument looks seductive, but the facts might, without

TABULAR STATEMENT WITH PARTICULARS OF 28 CASES OF
PROTRUSION.

		Molar Occlusion.		Lower Incisor Occlusion.	Low. Inc. Raised or Normal	Upper Arch		
		Left.	Right.			Length	Br'dth	Index
1	Miss A. P. Thumbsucker till two years before casts ...	N.	H.B.	Free	N.	45	43	94
2	Child aged 4. Thumbsucker ...	N.	N.	Free	—	—	—	—
3	Miss G.	N.	N.	Gum	R.	49	45	92
4	Thumbsucker	N.	N.	Free	—	—	—	—
5	E. (lad). Two protruding Centrals, Lo. Bics., and Rt. Can. and Lat. crowded ...	N.	N.	Free	N.	45	40.5	90
6	Miss O., Slight P.; L.L. six M. lost with disarrangement ...	—	H.B.	Neck	R.	41	38	92
7	Miss D. Severe P., wide space, separation	B.	B.	Free	N.	42	42.5	101
8	L. H.	B.	H.B.	Gum	R.	46	42	90
9	Miss E. Centre to right R. Rt. Canine unerupted ...	B.	B.	Free	N.	(45	39	87)
10	G. B. Long Centrals, Lip Biter	B.	H.B.	Free	N.	46	42	90
11	Miss W. Separation	B.	H.B.	Neck	R.	49	44	90
12	Miss T.	B.	H.B.	Neck	R.	45	42	93
13	Miss S. Severe Central P. Thumbsucker	B.	H.B.	Gum	R.	47	42	89
14	A. L. Receding Chin	N.		Gum	R.	47	46	98
15	A. W. Double Protrusion ...	B.	B.	Gum	R.	49	44	90
16	L. C. Protrusion with overlapping Cents	B.	B.	Free	Slight R.	45	41	91
17	M. M.	B.	B.	Free	N.	42	39	93
18	S	B.	B.	Free	N.	42	43	102
19	S	B.	B.	Neck	N.	42	41	97
20	Miss Z. Slightly protruded and crowded Incisors ...	H.B.	H.B.	Free	N.	45	42	93
21	Miss K. G. Severe protrusion Centrals	B.	B.	Gum	R.	44	37	84
22	Miss E. S.	—	B.	Gum	R.	38	35	92
23	— Very small Teeth. Slight P. with Spacing	B.	B.	Free	N.	39	39	100
24	Miss D. M.	B.	B.	Neck	N.	45	40	89
25	Miss B. B. Hereditary	B.	B.	Gum	R.	44	41	93
26	D. B. R. Lo Mol. lost early, derangement	H.B.	—	Gum	R.	50	(42)	84
27	H. O.	B.	B.	Free	N.	44	43	98
28	N. FF.	B.	B.	Free	N.	43	43	100

much difficulty, be stated so as to suggest precisely the opposite conclusion. An examination of these cases, it might be said, shows in many of them an abnormal development of bony tissue in the region of the upper incisors. This excessive formation of bone, due to an abnormal proliferation of bone cells, carries the teeth forward with it, and with the pressure we know to be constantly exercised by the cheeks and lips on the exterior of the dental arch, what more natural than that as a result of its elongation its sides should partially collapse? This seems to be partially at any rate, the view of Dr. Talbot, but his phrase about "the abnormal proliferation of bone cells," has always struck me as a particularly unhappy one. It is one of those explanations which offer no explanation. It has much the appearance of one of those phrases contrived more as a means of concealing our ignorance than of stating our knowledge, and to be inadequately contrived even for that. It is a truism and at the same time a paradox, for it implicitly denies the accepted doctrine that the alveolus, which alone appears to be concerned in these cases, is built up in support of, and is dependent upon the position of the teeth. I am far from denying that there may be in a few cases some "inherent vice," to borrow Mr. Tomes' phrase, in the development of the bone itself at this point, but that this is so in the majority of cases needs certainly more proof than exists at present.

On the other hand that the narrowness of the arch has some causal relation to its protrusion is shown, I think, by those cases occasionally seen where on one side of a protruded arch one of the teeth has failed to erupt. Here we find that there is a *vis a tergo* on the opposite side, which has driven the centre to the side of the unerupted tooth, and has left one central (the one belonging to the side on which there is the

full complement of teeth) more prominent than the other. It is fair to conclude that in these cases, had the missing tooth remained, and erupted in line, the protrusion would have been symmetrical and more pronounced than was actually the case. And further, in view of the cases mentioned above, in which slight protrusion is associated with general crowding, we are justified, I think in concluding that the same cause, according to the position of the developing teeth in their alveoli, may eventuate either in protrusion, in general crowding or overlapping of the incisors, or in the exclusion of one or more of the teeth from the dental arch, and that we must cease to regard protrusion, in at any rate many cases, as essentially and peculiarly a deformity by itself.

Talbot claims to have shown by an enormous number of most painstaking and careful observations made by himself and others all over Europe and the United States, and extending over a period of no less than eight years, that the latter diameter of the dental arches of certain peoples of the human race has diminished perceptibly within historic times. He says :—

“The early Briton possessed jaws which measured from 2.12 to 2.62 in their lateral diameters, while the jaws of the present English people measure from 1.88 to 2.44. It will be noticed that the minimum diameter has decreased more than the maximum. Again, by comparing the ancient Romans with the modern Italians of Southern Italy, we find that the jaws of the early Romans measured from 2.12 to 2.62, while the jaws of the present Southern Italians measure only 1.94 to 2.69.”*

Whether the observations he records are sufficiently extended to warrant quite so unqualified a statement as this, is perhaps open to question, but in the narrowness of the dental

* Talbot, “Etiology of Osseous Deformities of Head, Face, Jaws and Teeth,” p. 67.

arch which seems in general to be associated with protrusion, we have, I believe, on merely mechanical grounds, an important determining cause of the deformity.

The conclusions then which I think we may draw from the points to which I have called attention are: (1) That protrusion (where it is not due to external mechanical causes) is not simply a deformity of the front teeth, but one in which the arch as a whole is involved; (2) that it cannot be altogether regarded as a deformity *sui generis*, but is, in many cases, simply an alternative result of the action of the same causes which produce general crowding of the teeth, transitional forms being seen which exhibit both abnormalities in combination; (3) that if not actually found in the temporary teeth, it is at least foreshadowed in a large number of cases by posterior occlusion of the lower temporary molars; and (4) that in estimating the relative importance of the different factors concerned in its etiology, a large share as a determining cause must be assigned to the narrowness of the dental arch.

In a short paper like this, it is obviously impossible to discuss at length all the factors concerned in the production of such a deformity as the one under consideration. I have contented myself with calling attention to two, the importance of which has so far rather perhaps been undervalued than unobserved. Of the shortness of the vertical ramus of the mandible, the influence of the variations of its angle, the rising of the lower incisors and their impingement on the upper gum or teeth, and the influence of the lower arch in determining the character and extent of the protrusion of the upper—of these and their varying combinations there is much to be learnt before we shall be able to discriminate fully between the different varieties of the deformity and arrive at any adequate classification of them, and yet it is evident that even an approximate classification might modify considerably

the usual routine method of treatment. Here we have matter for further study, the value of which from a practical point of view cannot easily be overstated.

I am anxious here to express my thanks to several friends for assistance gladly given to me, to Professor Young of the Owens College, for placing skulls and other specimens at my disposal; to my partner, Mr. C. R. Morley, for the loan of models of several cases; to Mr. David Headridge, for help in measuring boys at one of the industrial schools, and also in measuring models; to Mr. J. A. Lees, for carrying out my ideas in contriving or altering instruments; and to him and my pupil, Mr. E. Irwin, in the preparation of models; and to Mr. W. F. Forsyth, for helping me to measure skulls at the College of Surgeons museum.

GOLD COLLARS INSTEAD OF FILLINGS.

By H. PEDLER, L.D.S.I. Calcutta.

We often come across cases where the patient complains of a gold wire or band on a plate cutting away the enamel and making the tooth very sensitive. This may be so bad that if any acid gets between the band and the tooth in eating, the patient has to leave the table and take the plate out.

I find that by putting a gold collar round, and placing the clasp on the outside of this band, great relief may be obtained. It is especially applicable, for instance, in the case of isolated molars and bicuspid's where the teeth are fairly square, and do not require much trimming. The collar is fitted on as if making a gold crown without the top. It is then cemented on, and the edge bevelled when the material has set. This method is less trouble than filling, gives no pain, and may also be used to protect old fillings, saving the tooth for a number of years.

DENTAL MECHANICS.
DENTAL LABORATORY.

By HARRY ROSE, L.D.S. Eng.,
Lecturer on Dental Mechanics, National Dental College.

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Continued from page 443.

Besides the methods already enumerated, the cast of an undercut model may be obtained by using a mould or flask as represented by Fig. 45: this mould was invented by Dr. Hawes, and for the following description of how it is used, and also the illustrations, the author is indebted to Harris' Principles and Practice of Dentistry. If the model be considerably

Fig. 46.

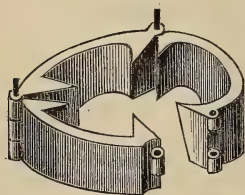


Fig. 47

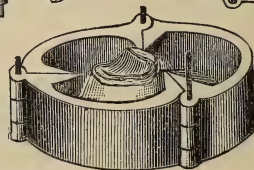
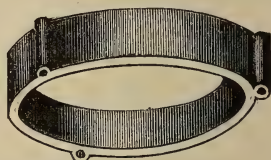


Fig. 45.

smaller than the space between the flanges projecting inward, small slips of paper may be placed in the joint, extending to the sides of the model so as to part the sand when opening the flask for the removal of the pattern.

The sand may now be packed around the model up

to the most prominent part of the ridge. It should be finished smoothly around it, slightly descending towards the model, so as to form a thick edge of sand for the more perfect parting of the flask.

The sand and face of the model must now be covered with dry pulverized charcoal, sifted evenly over the whole surface.

When this is done, the upper section of the flask is placed over the lower and carefully filled with sand.

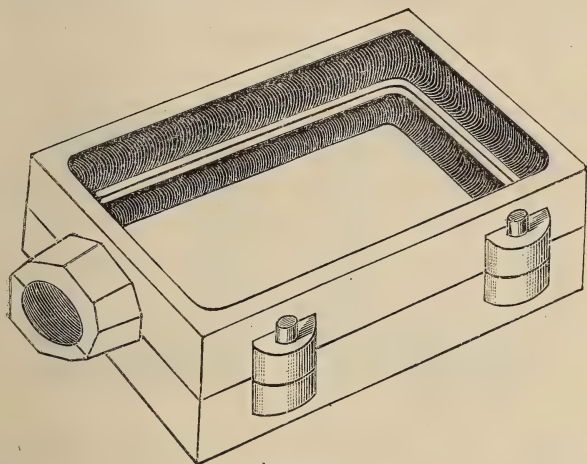


Fig. 48.

It is then raised from the lower one, which may now be parted by removing the long pin, and the model taken gently away. When closed, and the two put together again and inverted, it is ready to receive the melted metal.

In Fig. 46 the lower section of the flask is slightly opened to show joints. In Fig. 47 the upper section. In Fig. 45 the lower section is closed and confined by a pin, with the plaster model placed in it.

For obtaining a perfect cast of a pattern or model that is representing both the back and front, as well as the sides, a

double mould may be used similar to the one illustrated. Fig. 48. With a mould such as this, we are enabled to make the castings to form the mould for a soft rubber velum, or any other cast of a similar nature.

The method of using this appliance is the following. After separating the mould, Fig. 49, place one half on the floor of the sand box and fill loosely with sand, then press the model or pattern into the sand, so that it will withdraw without dragging, then condense sand around the pattern, make smooth and bring up level with the edge of the mould.

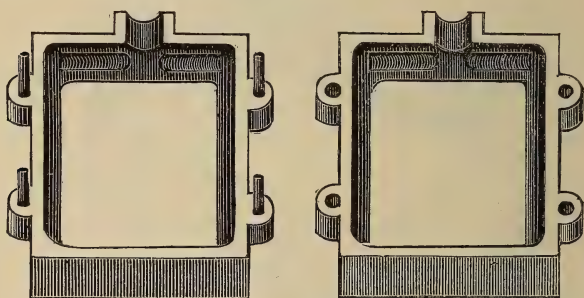


Fig. 49.

The exposed surface of the sand and the model is now dusted with French chalk, Lycopodium, or dry sand, and the other half of the mould is adjusted to it, this latter is then filled with sand which is pressed down so as to copy accurately the model.

The mould is then separated carefully and the model withdrawn. A bell shaped portion of sand is next cut out, leading from the outlet of the mould, down to the impression around which a slight groove is cut leading into the outlet of the mould and smaller fissures are also made extending from the sides of the impression into the groove around the same. This will allow for the escape of air or steam when the metal

is poured into the mould. Before this is done, the surface of the sand should be smoked with burnt resin, and then the two halves of the mould properly secured in a wooden frame to prevent it from bursting apart when the metal is poured in.

The smoking of the sand impression improves the surface of the cast, making it brighter and cleaner.

For casting small objects in the precious metals a mould may be used composed of brickdust and plaster in the proportion of two of the former to one of the latter. This mould may be made in sections if found necessary. Care should be taken to allow for outlet of air, in a similar manner to that described for a casting in sand, in the double iron mould, and and also to have a sufficient head of metal to prevent contraction in the small object to be cast. This mould must be thoroughly dried and made quite hot before pouring in the metal, and for this purpose, it can be secured with thin iron wire and placed over a Bunsen burner or into the fire for a few moments.

DESCRIPTION OF THE METALS USED FOR CASTING.

A list of the metals used for casting purposes has been previously mentioned, so it will only be necessary here to give a short description of their qualities and a few hints as to their usefulness in special cases.

Zinc is perhaps the most important of the coarser metals used in the dental laboratory, and takes the place of the brass and fusible metal models that were formerly used. Its melting point is about 775° F. When melting zinc, care must be taken that the metal does not become overheated, as it rapidly volatilizes giving off a yellowish-green flame. A

little fat thrown on to the heated metal will assist in preventing this. It sometimes gets thick and difficult to pour; to restore it to a more fluid condition, Sal Ammoniac may be thrown into the ladle and stirred into the zinc with a piece of wood. Fletcher recommends Hydrochloric acid to be used for the same purpose; of this a small quantity is poured on to the melted metal at the same time stirring it with a stick. This separates the dross which floats on the surface. Zinc alloyed with tin makes a sharper die than zinc alone and there is less shrinkage, but if the zinc is alloyed with too high a percentage of tin it is liable to melt when dipped into the molten lead which is to form the counter-die.

Lead is the metal most used for counter-dies, its melting point is about 617° F. It unites with tin in all proportions forming what is known as soft solder and pewter.

It is not an uncommon occurrence in the workroom for the lead and zinc to become mixed owing to using the wrong ladle.

The two metals may be separated in the following manner. Build up a good deep bed of sand in the box, then make holes six or seven inches long in it with the handle of a file or a ruler.

The contaminated metal is then melted and poured into the holes so made, and allowed to harden, on removing these casts from the sand a line of demarkation will be found where the two metals join, this can then be cut across and the metals are separated.

The lead, being the heavier metal of the two, sinks to the bottom.

If lead is present in a zinc cast, it will be found to occupy the teeth and more prominent surface of the alveolar ridge, thus rendering the cast useless.

Another way for removing lead from zinc is to take the

contaminated model, make it sufficiently hot in a ladle to melt the lead, then remove from the ladle and wipe the melted lead from the model with a rag.

Tin is another most useful metal in the laboratory—melting point is 450° F. It is often used as a counter-die to give the finishing touch to a plate after it has been swaged up in the lead counter, it drives the metal home more sharply on the model and by some dentists is used in lieu of chasing the plate with punches. It is one of the component parts of fusible metal.

A piece of pure tin emits a peculiar crackling sound when bent.

It is also one of the constituents of type metal.

Antimony (melting point, 840° F.) is principally used in the manufacture of type metal; like Bismuth it expands on cooling.

Type metal is an alloy of Antimony, the preparations being 5 to 8 parts lead—1 antimony and 1-50th block tin.

Or another formula $\frac{1}{2}$ antimony, $\frac{6}{7}$ lead, or 3 parts lead, antimony one.

When making these alloys the metals should be melted in the order of their fusibility, that is to say the metal having the highest fusing point should be melted first and then the others added, and the whole stirred with a piece of wood and poured either into a mould or other convenient form.

Type metal on account of its fusibility, its hardness, and the sharpness of outline it gives to a cast, is frequently used to make a small die and counter for those cases where one has to stamp up a small piece of metal, such as for repairs, for adding a tooth to a case, or for strengtheners.

For this purpose it may be melted in an iron pot, or in a small crucible over the flame of a Bunsen burner.

For these small plates an impression is taken of the surface

to which the plate is to be adapted, in composition this impression can be built up with plaster so that it can be readily cast in sand—this is to form the counter-die. Into this impression another soft piece of composition is pressed, this is to form the die, and it has to be built up with plaster the same as the counter-die. These are then cast in sand so that the die and counter-die are formed at one operation.

(To be continued.)

FORMALINE.

By Dr. G. FORSSMAN, Tandläkare, Stockholm.

Formaline is a solution of formaldehyd (methylaldehyd) CH_2O or H. COH in water. The water absorbs 40 per cent. of the gas.

Some months ago formaline attracted my attention, in consequence of the excellent qualities it possesses as a hardening fluid, and the idea occurred to me that advantage might be taken of this fact for dental practice. According to M. Snedel, if a finely dissolved solution be sprayed on walls, wall paper, and furniture, its disinfecting power extends to a good depth, destroying pathogenic bacteria and their germs. Experiments have been made by several investigators with solutions of 1 per cent. to 10 per cent. in strength. A 1 per cent. solution is fully reliable as regards making wounds and instruments aseptic. Silicious earth absorbs formaldehyd, and little by little gives it off again, so may be used in the surgery and in the instrument cupboard.

A strong solution of formaline, 30 per cent. causes pain to the epidermis, the mucous membrane of the mouth, and in deep cavities, so that in the first case mentioned, the epidermis hardens, and is afterwards thrown off, while in the two latter

cases no inconvenience at all arises. A solution of 1 per thousand can be used for rinsing the mouth and throat.

When treating partially inflamed pulps, I find that a 1—5 per cent. solution gives a satisfactory result, as besides being an antiseptic, formaline also acts as an astringent.

A filling can at once be placed above a cauterized and amputated pulp which has been treated with a 30 per cent. solution of formaline provided a piece of carbonized wadding, dipped in the solution, be applied to the roots of the pulp. I have, however, only done this in those cases where the patients needed very rapid treatment, having otherwise inserted an application for one or two days, after which time the procedure just mentioned was undertaken. After being treated with such a solution for twenty-four hours the roots of the pulp are found to be gray and hard though elastic.

For disinfecting teeth with gangrenous pulps, root canals that have been open for a long time, alveolar abscesses and periosteal inflammations, I have used the same with great success. In root canals [solutions of 20—30 per cent., in alveoli or abscess cavities solutions of 1—5 per cent., according to the quantity it is possible to use. The pain that may possibly arise when injecting it in the alveolus, or when syringing it, it is easily alleviated by cocaine.

It may appear that my statements concerning the strength of the solutions in the different cases are not very definite, but this is owing both to the short time, comparatively speaking, that I have been carrying on my investigations—only since last October—and that as a general rule, I decide the strength of the medicament used according to the special case and circumstances. As formaline has proved to have several qualities which to my knowledge are not combined in any other drug at present at our disposal, my intention in penning these lines is to call attention thereto.

British Journal of Dental Science.

LONDON, JUNE 1, 1895.

TUBERCULOSIS.

Much of the mystery which formerly surrounded the disease known as Consumption has, owing to Bacteriological advances, been dispelled. But with increased knowledge responsibilities are added, and the fact that tubercle may sometimes affect the mouth and neighbouring structures should remind us that dentists cannot afford to be ignorant of General Pathology, if only for the reason that they may know and understand local manifestations. Dental Surgeons have their attention directed, for instance, to lymphatic enlargements below the jaw, and the question of treatment of temporary molars is now frequently raised by medical men. As Mr. Roughton points out in his book, it is quite possible that the tubercle bacillus may affect the glands of the neck by having gained admission through a carious tooth. The excellent diagram illustrating his remarks upon the structure of a Tubercle has no doubt enabled many of our readers to make a fair acquaintance with the subject.

A dentist is often the first person, outside the family circle, to have the opportunity of inspecting a child's mouth, and he may thus occasionally be the first to discover abnormal conditions in other organs than the teeth. He, for instance, may find it his duty to direct parents' attention to the existence of enlarged tonsils and mouth breathing. In order to link our remarks together, we may point out that according to recent observations it may be supposed that such enlarged tonsils provide a favourable soil for the growth of the tubercle bacillus which finds access to the adenoid culture medium either with the food or from the air.

We do not propose to refer now in detail to the larger questions of contagion and infection, but draw attention to a communication by Professor Dieulafoy to L'Académie de Médecine. He describes a variety of pharyngeal tuberculosis affecting the adenoid tissue of the naso-pharynx, and he has inoculated guinea-pigs with fragments of enlarged tonsils and adenoid vegetations. Eight out of sixty animals inoculated with tonsil tissue, and seven out of thirty-five with adenoid tissue, became tuberculous. The material was taken from persons suffering from primary pharyngeal disease, that is, it was not consecutive to pulmonary tuberculosis. According to the account given by the Paris Correspondent in *The Lancet*, Professor Strauss has "demonstrated the presence of virulent tubercle bacilli in the nasal cavities of individuals habitually breathing the same air as phthisical patients." In order that bacilli may penetrate into adenoid tissue, it is not necessary that there should be an open wound, for they are thought to be able to enter through the epithelium.

With regard to swellings under the jaw and in the neck, due to tonsillar tuberculosis, these may be brought about by extension through the lymphatics when the bacilli are not destroyed in the adenoid tissue by phagocytes. If the glandular disease, in turn, is not localised, then the lungs may become affected from the cervical glands through the lymphatics, thoracic duct, and the right side of the heart.

M. Chauveau states that animals may become infected by inoculation of the adenoid tissue at the base of the tongue when swallowing tuberculous matter, and that this is proved by the swelling of the cervical and maxillary glands.

CROWN AND BRIDGE WORK.—Dr. Alton H. Thompson says that while admiring the achievements in this branch of dental jewelry, and the progress that has been made, yet to the cautious mind there are elements in that progress that

make it unsatisfactory. The reckless disregard of its limitations suggests grave doubts as to the practical benefits to be conferred by some of these high-class operations. We have disagreeable misgivings that the progress of the day is too much toward high art, the production of conspicuous dental jewellery, regardless of the physiological principles and the underlying scientific principals of such operations. There is too much art and not enough science about it. The worship of art leads to overtaking nature. The teeth are asked—perhaps expected—to support more than nature ever intended that they should. A given root is designed to support one crown, and no more. If the burden is multiplied, it is only a matter of time when nature will succumb and the pier teeth be lost.

Another matter, that has not received the consideration it deserves in connection with bridge-work, is the loss of the interstitial motions of the teeth used for support, which must result in periosteal irritation. There are several slight motions of the teeth in the sockets : (1) (insterstitially) from one proximate tooth to the other ; (2) sideways ; (3) partial motion in the sockets ; (4) perpendicularly in the sockets. These motions arise by use in mastication and are imperceptible to sight or feeling, but they are more or less valuable to the health and usefulness of the parts, and are prevented almost completely by binding the teeth together in bridge-work. Mechanical accessories should be employed to accomodate these motions, but that would perhaps be impracticable.

In regard to this, as to all other mechanical operations in the mouth it would be better to study, to understand in a scientific manner, what we attempt to do, not to overtax nature, and to be very sure we do not transgress the hard and fast physiological bounds in order to produce highly artistic results.

A DENTURE AS A PILL-TRAP.—At a Pharmaceutical meeting at Edinburgh recently, a paper was read upon smaller-sized pills, and in the discussion which followed Mr.

Lunan said that whilst, no doubt, the tendency was in the direction of elegance, it must not be forgotten that there are objections to very small-sized pills. They might get lost, and he related the case of a lady who professed to obtain great benefit from a small liver pill; it was discovered next day in her artificial denture. What sort of apparatus could this be? We presume that the pilule had not gained access to a suction chamber! and are therefore inclined to the belief that tube teeth afforded the necessary interstice. Opponents of bridge-work, however, may be unkind enough to suggest that a "self-cleansing space" would provide a resting place for the little peristaltic persuader.

THE LATE SIR RICHARD OWEN.—The life of this celebrated anatomist, published in two volumes by his grandson, contains a chapter on "Owen's Position in the History of Anatomical Science," by Professor Huxley. "His claims to high place among those who have made great and permanently valuable contribution to knowledge remain unassailable." Sir Richard, however, did not fall in with Darwinian views, and it is upon his anatomical and palæontological work rather than upon his philosophical speculations that his reputation will rest.

SCHOOL CHILDREN AND THE TOOTH-BRUSH.—Dr. J. C. McCoy says that in one school of 700 pupils, 500 from 10 to 18 years of age, he distributed printed slips with the following questions: Do you cleanse your teeth with a brush every day? Do you cleanse your teeth with a brush twice a day? The teachers requested the pupils to answer the questions by writing the word, yes or no, to each question. The slips were immediately gathered up, and it was ascertained that out of 500 pupils, 50 cleaned their teeth twice a day; 275 used the brush sometimes; while 175 did not own a brush. In the primary department of 200 pupils

from 6 to 10 years of age, the teachers said they did not think there were 10 children in the department who used a toothbrush.

This school is not an exceptional one in this matter, as further enquiry and investigation demonstrated. In fact its graduates take high rank at American universities, and if there is any difference, it is in advance of most schools in percentage of those who have clean mouths, as well as neat clothes and bright faces.

THE HOLLAND DENTAL ASSOCIATION.—We understand that a two-days' meeting of this Association has been arranged for the 28th and 29th inst. Dr. Herbst is expected to attend and he will demonstrate some of the methods with which his name is connected. Dr. Brandt will show Obturators and prosthetic apparatus for the mouth and nose, whilst among the other subjects to be dealt with is that of the School-Children's Teeth question, upon which one of the members is to read a paper. The meeting will be held at the Amsterdam University.

PRELIMINARY EXAMINATIONS.—The report of the Government visitor to the First Pharmaceutical examination in London shows that the majority of the Candidates have had a very defective preliminary education. The percentage of rejections rose to 51 but this is under the average of the past five years. Arithmetic seems to be an especially weak point and one in six of the candidates failed in every subject. Dr. Stevenson says, "This examination is by no means a severe one for youths, but unfortunately many of the candidates are, I believe, young men already engaged in the business of pharmacy." We notice that there seems to be a strong opinion as to the necessity for insisting that the preliminary examination should be passed before the apprenticeship

commences. With regard to the later examinations, Dr. Stevenson speaks with approval of the appointment of teachers as Examiners, "since there is no one so well fitted to examine and to gauge the knowledge of students as he who is engaged in teaching a science."

RESPONSIBILITY FOR CHILDREN'S TEETH.—Mr. Campbell, the retiring President of the Odonto-Chirurgical Society, alluding to the necessity for educating the public, says that he has recently issued a note to his patients pointing out the advisability of having their children's teeth examined periodically—every three or six months as the state of the mouth may seem to require. The children's names are entered in a book kept for the purpose, and opposite each name is placed the date when they are next to be sent for. In this way he assumes the responsibility of the care of the teeth of those children whose names are entered in this book. He has done this only recently, and can hardly speak definitely of the value of the results, but, so far, the effort seems to have been attended with success.

POISONING BY LYSOL.—This antiseptic has caused the death of a child to whom it was administered by mistake, instead of a laxative. Dr. Haberda has shown that the poisonous action of lysol is due to its containing kresols. It cauterises the skin and mucous membrane, and when absorbed it affects the brain and spinal cord, producing unconsciousness, general spasms, reduction of temperature, and bleeding into the uriniferous tubules. He therefore recommends that it should be prescribed only in dilute solution.

THE TEETH OF POST OFFICE CANDIDATES.—It will be remembered that not long ago there was an outcry about the enforced extraction of teeth supposed to be obligatory in

the case of a candidate for the Post Office Service. Mr. Gully communicated with the Postmaster General, who has replied, "I am glad to be able to send you the enclosed memorandum showing that the statements made had been made under a misapprehension as to the requirements of the Post Office in selecting candidates for appointment." The following is the memorandum referred to:—"In the case of candidates whose teeth are defective, the practice of the Department is as stated in the enclosed form. It will be seen that without expressing any opinion as to what should be done the department (through its medical officer) merely intimates that the teeth are not in a satisfactory condition, and that before the nomination can be proceeded with the candidate must consult a dentist. All the Department requires is a certificate that the condition of the candidate's teeth are not such as to interfere with the efficient discharge of his duties." The "enclosed form" is headed "Teeth form," and is to be signed by the medical officer. After setting out the name of the candidate in full it proceeds:—"Your teeth do not appear to be in a satisfactory condition, and without further information I cannot report you as fit for appointment. If therefore you wish your nomination to be proceeded with you should see a dentist and obtain his certificate on the subjoined form." The form prescribed for the dentist's certificate is as follows;—"This is to certify that I have seen this candidate, and that the condition of his teeth is not likely to interfere with the efficient discharge of his duties."

SINE CURRICULO.—A Bill to regulate the practice of Dental Surgery has been brought before the Legislature of Illinois. It is proposed to ignore all dental diplomas, whether granted in the United States or elsewhere, and to permit any person to appear as a candidate before the Examining Board. Apparently no enquiry is to be made as to what steps the candidates has taken to render himself efficient for practice; provided he can get through the examination he would be on the same footing as a full curriculum man.

Abstracts of British & Foreign Journals.

EVOLUTION AMONG PLANTS.

At a recent meeting of the Massachusetts Horticultural Society, Professor L. H. Bailey, read a paper on "Experimental Evolution among Plants." The speaker said that all thoughtful persons are now evolutionists, whether they know it or not. They believe in some kind of a transformation of species in the same way that they believe in the gradual unfolding and growth of human institutions. It is by no means essential to a belief in evolution that the person should hold to a single origin of all forms of life.

The speaker then proceeded to consider the question, "Do new species originate now?" The notion that a species, to be a species, must have originated in nature's garden and not in man's, has been left over to us from the last generation—it is the inheritance of an acquired character. John Ray, toward the close of the seventeenth century, appears to have been the first to use the word species in its technical natural history sense, and the matter of origin was an important factor in his conception of what a species is. Linnæus' phrase is familiar. "We reckon as many species as there were forms created in the beginning." Darwin elaborated the new conception—that a species is simply a congregation of individuals which are more like each other than they are like any other congregation,—and with a freedom from prejudice which is rarely attained even by his most devoted adherents, he declared that "one new variety raised by man will be a more important and interesting subject for study than one more species added to the infinitude of already recorded species."

The despair of systematic botanists is a proof of evolution. If species are not original entities in nature, then it is useless to quarrel over the origination of them by experiment. All we want to know, as a proof of evolution, is whether plants and animals can become profoundly modified under different conditions, and if these modifications tend to persist. Everyone interested knows, as a matter of common observation and practice, that this is true of plants. He knows that varieties

with the most marked features are passing before him like a moving panorama. He knows that nearly every plant which has been long cultivated has become so profoundly and irrevocably modified that people are disputing as to what wild species it came from. Consider that we cannot certainly identify the original species of the apple, peach, plum, cherry, orange, lemon, wine grape, sweet potato, Indian corn, melon, bean, pumpkin, wheat, chrysanthemum, and nearly or quite a hundred other common cultivated plants. It is immaterial whether they are called species or varieties. They are new forms. Here is the experiment to prove that evolution is true, worked out upon a scale and with a definiteness of detail which the boldest experimenter could not hope to attain were he to live a thousand years. The horticulturist is the only man in the world whose distinct business and profession is evolution. He of all other men has the experimental proof that species come and go.

Pharmaceutical Era.

IS SCIENCE BANKRUPT?

Professor Ray Lankester, F.R.S., at the Royal Institution taking as his subject, "Thirty Years' Progress in Biology," referred to the baseless attack of M. Brunetière, of the *Revue des Deux Mondes*, upon science, and declared that it was only to the impatient and ignorant that the phrase "bankruptcy of science" could appear to have even the smallest justification. Biological science had never proposed to do more than to ascertain the order of nature, including man's nature, and ^{it} had steadily advanced, and, indeed, made wonderful discoveries in the past 30 years. The first of these to which he drew attention was the increase of our knowledge as to the living substance of plants and animals called protoplasm. Protoplasm occurs either as single or connected corpuscles called "cells," each provided with a nucleus, or peculiar central body. Attention was first drawn to the discovery that the protoplasmic cells of plants are not each isolated and boxed in by a dense cell-wall, as once supposed, but that the living substance is continuous from cell to cell by means of

fine threads. The foam-like or emulsion structure of protoplasm was described, and then the recent discoveries as to the importance of the nucleus. The part played by the nucleus in the fertilization of the egg by the spermatozoon was specially described and illustrated by numerous large wall diagrams.

GOUTY PERICEMENTITIS.

By DR. EDWIN T. DARBY, Philadelphia.

I think it may be said to be generally admitted that two distinct forms of calcic deposits are to be found upon the teeth, the one salivary, the other serumal, or, as Dr. Pierce terms it, hæmatogenic. Again, it is believed by many that the last mentioned variety is often deposited at, or near the apices of the roots of teeth before any lesion or pocket has been formed at the gingivæ. Again, it has been claimed by some that the hæmatogenic variety is an irritant, and is the cause of one form of pyorrhea alveolaris, and not the sequence. In other words, that it antedates the inflammation instead of being the result of the inflammatory condition. The alveolocemental membrane is a connective tissue fibrous in character, exceedingly vascular, and resembling the connective tissue found in articulations and joints in other parts of the body. Its function is not unlike that of other connective tissue, and experience has shown that it is susceptible to the same morbid influences.

Observation has shown that few teeth are lost from any form of pyorrhea alveolaris before the thirtieth year, and that the disease cannot be considered common before the fortieth year. Experience and observation have shown that gout and rheumatoid arthritis are not common before the thirtieth year, but that in one form or another they are quite common after the fortieth year. Analysis has shown that the blood of gouty and rheumatic subjects contains a larger percentage of uric acid than is normal, and that in certain conditions of the system this acid in combination with calcium and sodium is precipitated and retained in the connective tissue of articulating surfaces, producing all the conditions of

inflammation except one,—viz, suppuration. Analysis has shown that the deposit found upon the roots of teeth contains uric acid in combination with calcium and sodium, and that such teeth are frequently found in the mouths of those known to have a gouty tendency or a pronounced gouty diathesis. But you tell me that these coincidences do not establish truths; that uric acid may exist in larger proportions than is normal in the blood of many persons, and yet there may be no manifestations of gout or rheumatism. Candour compels me to admit the force of the objection: at the same time, I can see no reason to suppose that fibrous tissue, wherever located, may not under similar conditions be equally susceptible to the deposition of uric acid. Dr. Alexander Haig, in his work on "Uric Acid in Causation of Disease," claims that he is able, by certain articles of food, certain beverages and medication, to drive uric acid from the blood to the joints and back again from the joints to the blood; that it is simply a matter of increased or decreased alkalinity of the blood. Dr. Garrod has shown that the cartilages and fibrous tissues of joints are less vascular and less alkaline than the other tissues or the blood; and since that is so, the arthritis produced by uric acid is a simple matter of solubility, and can be produced at pleasure to almost any extent.

The object of this paper is to describe a few peculiar cases which have come under my observation during the past fifteen or more years,—cases which at the time puzzled me not a little, and even now would bear a little illumination.

Mrs. A., perhaps forty years of age called, suffering much discomfort from a first superior molar. The tooth was sound with the exception of a minute filling in the masticating surface. All other teeth were present in the mouth, and no indication of disease elsewhere. The first thing to attract my attention was a tumefaction at or near the apex of the buccal roots. It was quite large and presented much the appearance of an apical abscess just ready for the lancet, except that its colour was dark red, almost purple in hue. The tooth was somewhat elongated, and sore to percussion or pressure. Without a moment's hesitation I decided that the tooth was a devitalized one, and with a spear pointed drill in the engine proceeded to make an opening into the pulpchamber, the gold filling being my starting point. As I approached the pulp my patient gave indication of increasing pain, but supposing that to be caused by my pressure upon an inflamed perice-

mentum, I lessened the pressure and revolved my drill with greater rapidity. You can imagine my surprise and chagrin when I found that I had plunged my instrument into a vital pulp. I said to myself, An anomalous case, indeed—an abscess upon a vital tooth! I then began to look for a cause, but to my surprise there was no break at the gingivæ, no salivary or serumal deposits to be seen, and no pus in what I had taken to be a sac. Baffled and confounded, I applied the ordinary remedies for pericementitis, devitalized the pulp and extirpated it, filled the canals, pronounced myself a careless dentist, and awaited results. Subsequent attacks of a similar character extending over a period of perhaps five years, rendered the tooth a source of annoyance and discomfort. My patient finally concluded that an empty house was preferable to a bad tenant, and it was removed, the first break in an arch which contained sixteen beautiful teeth. Near the apex of the buccal roots of the tooth in question a deposit of considerable serumal calculus was found, and in my opinion this was the cause of the first attack of pericementitis. I cannot say of my own knowledge that this lady ever had an attack of gout, but I do remember that prior to her death, her hands were much disfigured by nodosities upon the joints of the fingers. If this lady was a victim of uricacidæmia, it may have taken the form of rheumatic arthritis, instead of gout as generally understood. Garrod says, "It is by no means rare to hear of inflammation of a joint, by one practitioner called gout, by another rheumatism, and by a third rheumatic gout."

The following case is more satisfactory, because the patient is living and I have been able to follow it until the present time. Miss B., aged about forty-five called, with a second inferior molar somewhat elongated and exceedingly sore to the touch. I observed the same tumefied condition upon the gum near the apex of the root, the same angry red appearance of the mucous membrane. The tooth was a sound one, never having been carious. Remembering my former case, I did not attempt to open the tooth, but gave it such treatment as is general in pericementitis. I naturally looked for some exciting cause in the form of calculus, but failed to find any, either upon the tooth in question or other teeth in the mouth. I am positive that there was no pocket at the gingivæ. This attack lasted for several days and gradually subsided, but was followed a year or more later by another,

at which time a pocket was apparent, and pus exuding from about the neck of the tooth. The tooth was finally lost, and serumal deposits found near the apex. Two other molars and a bicuspid in this mouth have had like histories during a period of ten years. Another molar is apparently to be lost in the same manner, for during the past few months I have seen the case to give it such treatment as I could to relieve existing pain. I may say just here that but one tooth in the mouth has been affected at the same time, and there is no appearance of pyorrhea alveolaris in any part of the mouth.

I have recently learned the following facts, which it seems to me have an interesting bearing upon this case. The father, whom I knew well, had been a lifetime sufferer from gout, the classical kind, which began with painful manifestations in the great toe, and did not often get above the ankle joints. He had been a patient of mine for twenty years, and has lost many of his teeth from pyorrhea alveolaris. The daughter, whose case I am describing has never been in robust health, and has frequently had painful attacks of gout of the stomach. It seems to me that to an unprejudiced mind the proof of an inherited gouty diathesis is almost positive, and if uric acid has any part in the production of calcic pericementitis, here is a case to warrant the supposition that it was the exciting cause in the attacks narrated.

The case which I am about to describe next would seem to furnish more positive evidences of the dual existence of uricacidæmia manifested in the form of gout and inflammation of the alveolo-cemental membrane than either of those previously mentioned. It is that of a bachelor of about fifty years of age, who called upon me about three years ago with much the same conditions which I have described in the preceding cases. At that time a bicuspid of the superior jaw was the seat of pain. The gum presented the same swollen and angry red appearance. He complained of great sensitiveness to heat and cold, and to pressure. As the tooth was without fillings or cavities of decay, I did not open it, but gave it the ordinary local treatment common in cases of incipient pyorrhea alveolaris. It was some days before relief was obtained. At that time there were no other teeth similarly affected. As I remember the case, there was no discharge of pus following the attack. A year, or possibly eighteen months subsequently, the gentleman called, suffer

ing pain in the same tooth ; this was followed by suppuration, and, of course, a pocket at the gingivæ. Since then two or more teeth have had like histories. Anxious to know whether this individual had the uric-acid vice, I enquired of an intimate friend of his and learned the following particulars. "He had been a 'high liver' for many years, indulged freely in wine, and especially champagnes ; is a great sufferer from gout and dyspepsia."

I have reserved until the last a case which impresses me as being of peculiar significance. A gentleman between sixty and sixty-five years of age has called upon me several times during the past six months, complaining of great discomfort in a superior molar. It has been somewhat elongated and painful in mastication. There have been no marked indications of gingival irritation, no deposits of calculus, but redness and tumefaction along the buccal aspect of the gum. It had failed to respond to ordinary treatment, and as other teeth had been lost from similar attacks, the gentleman insisted upon having this one removed. I found deposits of serumal calculus on both buccal roots. In reply to my inquiry as to the presence of gout or rheumatism in the system, he pointed me to his feet, which were encased in shoes made of soft kid and greatly out of proportion to the man's stature. He then said, "I have been a great sufferer from gout for many years. I inherited it from my ancestors."

I could mention other cases which have had similar histories, but no additional light may be shed on the subject under consideration. I have never been satisfied with the theory that all cases of pyorrhea alveolaris were of local origin, and while I cannot furnish proof positive that uric acid plays an important part in the formation of the calcic deposits to be found high up upon the roots of the teeth, I can see no objection to such a theory ; and why, I ask, may it not be so ? Why may not the connective tissue forming the alveolo-cemental membrane be the seat of uric-acid formations just as often as the joint of the big toe, the ankle, the knee, or the phalanges ? The physiology and pathology of such a process is as simple as that of the pin-point nodules which are left upon the mitral valves of the heart in rheumatism, or the concretions of the kidneys.

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, April 1, 1895. Mr. Frederick Canton, M.R.C.S., L.R.C.P., L.S.A., L.D.S., President, in the chair.

The Minutes of the last meeting were read and confirmed.

Mr. F. E. Davar, L.D.S.I., Church Gate Street, Fort, Bombay, having signed the obligation book, was admitted a member.

The following were balloted for and elected resident members of the Society :—Francis Mark Farmer, L.D.S. Eng., 17, Great Marlborough Street, W. ; Harry Symes Prideaux, L.D.S. Eng., 41, Wimpole Street, W. ; Frederick James Frankland Rooke, L.D.S. Eng., 42, Kensington Gardens Square, W.

The following were balloted for and elected non-resident members of the Society :—J. Main Nicol, L.R.C.P. Lond., M.R.C.S. Eng., L.D.S. Eng., 2, Clarendon Road, Leeds ; George Arthur Peake, M.R.C.S. Eng., L.R.C.P. Lond., L.D.S. Eng., Alma House, Cheltenham ; Frank C. Porter, L.R.C.P. Lond., M.R.C.S. Eng., L.D.S. Eng., 12, Oxford Street, Nottingham ; George Nash Skipp, L.D.S. Eng., Sale, Cheshire.

The following were proposed for non-resident membership :—William Jarvie, M.D.S., 105, Clinton Street, Brooklyn, New York ; John William Tomlinson, L.D.S., 8, Warrior Square, St. Leonards-on-Sea.

The LIBRARIAN reported that Mr. R. H. Woodhouse, a Vice-President, had presented to the Society seventeen bound volumes of the *Medical Society's Transactions* from the year 1872 to 1894, and that he had received the *Manufacturing Chemist*, and the *Smithsonian Report* for 1893.

The CURATOR said he would like to make a request of members of the Society that had been made before, viz, that if any gentleman possessed old specimens of mechanical dentistry the Society would very gladly receive them, more especially cases of bone work, and particularly those having natural teeth inserted. These things were becoming year by year more scarce. Probably the majority of them got thrust on one side, whereas in a Museum like theirs, where a num-

ber of them could be viewed together, they were very valuable, and could be as useful and more so than in private collections. Some years ago a member of the Society did present a large number. No doubt many members had plates of the description referred to and they would be a great acquisition to the Museum.

Mr. BRUNTON showed a modification introduced in a Hodge right-angle handpiece, by simply shortening the portion which carried the bur to enable the operator to get at the more awkward places in the mouth. It was specially useful in children's mouths. The nut at the back was shortened, and there was a key provided for tightening it up, but in practice the key was not absolutely necessary. (The modification is supplied by the Dental Manufacturing Company.) He also showed a simple balance for weighing amalgam, and a rack arranged for holding mallet pluggers, so that with one hand the points could be changed.

Mr. CAMPION then read the paper which is published on page 481.

DISCUSSION.

The PRESIDENT said he had noticed in some cases of protrusion that the patients suffered from post-nasal growths. Possibly that might have something to do with the protrusion, though he was not prepared to say in what way, but cases continually presented themselves where the two conditions were associated.

Mr. DAVID HEPBURN said the Society owed a deep debt of gratitude to Mr. Campion for his excellent paper on a very important and difficult subject. He had thrown much new light upon it, and this would doubtless give rise to further thought and investigation. Of course they could not but think of the influence of heredity in the condition called "superior protrusion," and no doubt in many cases the peculiarity was one which was inherited, perhaps from one or both parents; still, on the other hand, there were an extraordinarily large number of cases which appeared to spring up *de novo*, the child as it grew developing the abnormality of the jaw and teeth without traces of it being discoverable in the parents. He had two or three very pronounced cases under treatment at the present time, in which the parents had perfectly normal arches and particularly fine sets of teeth with normal bite, and yet the children, or perhaps one child

out of the family, had developed this condition of protrusion.

Whether it was due to some state of development of the cranial bones at a very early stage imparting a peculiarity to the jaws as they developed at a later date, or whether it arose merely from an abnormal growth of bone on certain portions of the jaw, was very difficult to decide. It seemed that the abnormality was more evident at a certain time of life than at another, apparently commencing as a rule with the eruption of the upper permanent teeth, increasing in intensity for three or four years, and then ceasing. He had risen, however, particularly to mention a case which had come under his notice quite recently. He regretted that he had not up to the present been able to obtain a model of it, but he would do so, and would submit it to Mr. Campion for examination. It was a case of pronounced "superior protrusion" in a child aged $4\frac{1}{2}$ years. He had occasionally noticed a slight advance of the superior temporary incisors, and he had sometimes seen in children conditions which he thought indicated a future state of protrusion, such, for instance, as an abnormally high alveolus, with two rounded eminences above the temporary incisor teeth. This particular child, however, a very bright little fellow, whose parents had perfectly normal jaws, had distinct "superior protrusion," to the extent of about half an inch. No doubt others might have seen such cases, but as that was the only one that had come under his notice he thought it worth mentioning.

Mr. STORER BENNETT said he very much regretted the failure of the lantern just at the last part of the paper, because in the first place it had prevented their seeing one or two more of Mr. Campion's extremely interesting slides; and secondly, because it had prevented his (Mr. Bennett's) having the opportunity of showing a few slides which he had prepared, and which would have been of interest in illustration of some observations he wished to make with regard to the subject of superior protrusion. On the table there were four specimens from which photographs were taken, and to which he would draw attention. As far as he could gather, Mr. Campion made no mention of the extreme shortness of the molars in these cases. It was a matter of common observation in superior protrusion that the molars were extremely short, that is, they were erupted to a very slight extent, and it was very well shown in some of the photographs exhibited, in which the shortness was very obvious. He thought that had a very

large influence in determining these cases of superior protrusion. Then, as another element, they had of course to do with a higher portion of the lower incisors and their noticeably fan-shaped arrangement. The lower incisors biting against the backs of the upper ones, and later on, against the gum, drove the upper teeth forward. The reason for the increased height of the lower incisors might be two-fold. It was in many cases brought about by difficulty in the eruption of the lower canines. On examining one of the specimens on the table it would be seen that the lower canines were pressing against the roots of the lower incisors and driving them inwards. There was thus shown the commencement of the fan-shaped arrangement of the lower incisors. In a second specimen it was more marked still, and this was, he thought brought about by the sides of the crowns of the lower canines pressing against the roots of the incisors, driving together the apices of their roots, with the result of course that the crowns were spread. Then, as the lower canines tended to erupt, they would tend to drive up the incisors farther and farther. Another of the specimens showed very distinctly the fan-shaped arrangement of the lower front teeth in connection with superior protrusion. He thought the rising of the lower incisors was due to this difficulty of eruption of the lower canines, and that the biting of the lower incisors against the upper ones was not prevented—as it should be—in consequence of the extreme shortness of the molars. The photographs shown by Mr. Campion illustrated very beautifully this extreme shortness, and the same thing was very noticeable in the models. Those were two of the factors starting superior protrusion. The moment the front upper teeth began to travel forward the lower lip invariably dropped behind, and that had a very large influence in continuing the protrusion once it was started. After a time the upper lip was drawn up so as to lie more over the roots than over the crowns, thereby ceasing to counteract the effect of the lower lip. The lower lip drove the teeth further forward, till a certain distance was reached, when it no longer influenced them. These were three points that had large influence in such cases. The thanks of the Society were certainly due to Mr. Campion for the extremely interesting nature of his paper.

The PRESIDENT said that they hoped to see Mr. Bennett's slides on a future occasion.

Mr. CAMPION said that Mr. Hepburn had alluded to "here-

dity" as a factor in some of these cases. Probably all would readily agree with Mr. Hepburn that it was, but it was a question to his mind whether even heredity did not act, at any rate in many cases, through the narrowness of the arch. From his observation of such cases there appeared to him to be really very little doubt that the narrowness of the arch was a large determining factor—not the only factor by any means, for there were many others. Mr. Bennett had kindly supplemented the paper by alluding to one or two more, but as he (Mr. Campion) had said, it was quite impossible to treat all these factors in one short paper. He therefore preferred to confine his attention to two, and to discuss those as thoroughly as he could in the time allotted. Mr. Hepburn had referred to a case of superior protrusion in a child of 4, and it curiously happened that a similar case was to have been shown in one of the slides at the end. He had there a model of a child with very pronounced protrusion of the upper and receding of the lower incisors, in which there was a very undoubted history of thumb sucking, and in that case the molar articulation was normal. A most interesting point alluded to by Mr. Bennett was the shortness of the molars and the uprising of the lower incisors. That was a point which he very much wished to investigate, and he should be extremely interested to hear Mr. Bennett's views upon it. He had often wondered whether the uprising of the lower incisors was some abnormality in itself, or was simply due to the fact that the molars had not come up to the proper level, and that, therefore, the rising of the incisors was apparent rather than real. That was a very interesting point on which he had formed no conclusion and on which he had really made no investigation. Mr. Bennett's allusion to the difficult eruption of canines as a cause of the fan-shaped appearance of the lower incisors was also very interesting—it seemed to afford a rational explanation of the appearance; but going still further back, he thought that the difficult eruption of the canines and the consequent compression of the incisor roots was really due to an abnormal narrowness of the arch. Those, he thought, were the main points touched upon, and he had only, in conclusion to thank the members for the very patient hearing they had given to him in what he feared was a dry exposition of part of the subject. A large number of models of the deformity were on the tables for inspection.

The PRESIDENT offered the thanks of the Society to Mr. Brunton for his casual communication, and to Mr. Campion for his very interesting paper.

STUDENTS' SOCIETY, NATIONAL DENTAL HOSPITAL.

The usual monthly meeting of this Society was held on Friday, May 3rd, at eight o'clock. Alfred Smith, Esq., President, was in the chair.

The minutes of the previous meeting were read and confirmed, and the usual welcome given to visitors present, and Mr. Loftus H. Canton having been balloted for, was unanimously elected a member of the Society.

CASUAL COMMUNICATIONS.

Mr. SPOKES showed, in the optical lantern, a dozen slides illustrating tooth tissues and various dental matters of interest.

Mr. W. J. HUMBY showed a right upper bicuspid having three fairly well-marked roots.

Mr. MULLORD showed a case of Mr. Fox's, which consisted of an upper molar (left) which appeared sound, but was the cause of pain in the left ear; on extraction and examination of the tooth, it was found to contain a pulp-stone.

Mr. SPOKES said that he had met with cases of pain in the ear which seemed undoubtedly due to the condition of the upper molars, and he referred to the investigations on this point, carried out by Dr. Head.

Mr. ALFRED SMITH in remarking on the difficulty of diagnosis of pulpstones, mentioned the case of a patient who came to him with toothache on the upper left side. All the teeth appeared good, and as the patient was of a gouty habit, he was advised to consult a medical man. He did so, and was found to be suffering from eczema in the ear; this was treated and the toothache ceased.

Mr. GLASSINGTON, who was unable to be present, sent the model of the mouth of a girl, æt. 8, showing a malformation in the region of the left central and lateral. Mr. Glassington was of the opinion that it was not only a case of gemination, but that the central and lateral had also changed places, this could only be proved by waiting to see if another tooth appears. There was a ridge of enamel on the lingual surface

which added to the abnormality. It was also noticed that the central and lateral of the right side were almost of the same size. Mr. Glassington advised waiting until the patient is 14 or 15 years old, to see how the rest of the teeth came down, and then if this deformed tooth still takes the place of the central and lateral, to have it either extracted and replaced artificially, or to cut it off and crown with two teeth.

The President then called upon Mr. Harry Rose for his communication on Continuous Gum.

Mr. HARRY ROSE in his opening remarks stated that the first experiments of any importance in Continuous Gum Work were made by M. Delabarre in 1820.

These were followed by the further investigations and improvements of Drs. John Allen and Hunter in 1852. Since then the invention of new mechanical appliances and the advancement of dental art generally has done much to perfect the work and render possible the manufacture of such exquisite copies of nature as are now familiar to most dental surgeons.

Mr. Rose then proceeded to explain his method of construction of an edentulous continuous gum case :—

The impression having been taken and the model made in the usual manner it is generally advisable to strike up a 'dummy' plate in german silver or other suitable metal, to test the suction and take the 'bite' on.

It is of course very important to get good suction. Everything having been found correct the next step is to obtain zinc dies and lead counters from the plaster model and strike up a platinum plate of about No. 5 or 6 guage.

The plate should have a piece of thin platinum wire soldered along its edge to allow for smoothing, trimming, and relieving after the completion of the case, as otherwise an untidy edge would result.

Next the surface of the plate that is to be covered by mineral must be roughened ; this can be done either with the corner of a flat sculptor or a 'graver,' the former answering the purpose very well. The roughening should resemble that on a rasp, and when completed the surface of the plate possess a 'nutmeg-grater-like' appearance.

Small tags of platinum are then soldered on to the plate in convenient positions, i.e. where they will not come in the way of the teeth, and have a sufficient thickness of mineral over

them. These furnish an additional source of union between the mineral and the platinum plate.

All soldering must be done with *pure* gold as even the slight amount of alloy in coin gold is sufficient to discolour the gum enamel where they come into contact.

The teeth should now be mounted on the platinum plate with wax as in ordinary vulcanite work, leaving however a slight interval between each about the thickness of ordinary note paper; the object of this will be explained later. Next try the set in the mouth and make any alterations that may be necessary. Making the 'sections' is the next step and is accomplished in the following manner.—Having previously boiled the model out in stearine, make small cuts or grooves in the front and sides with a rounded sculptor; these serve as guides for the sections. Then place the case in situ, soap the front of the model and wax, mix up some plaster and build it out over the labial surfaces of the 6 anterior teeth, the waxed-up gum corresponding to them and the plaster model, forming when set a sort of shell of plaster holding these teeth in position. When this is hard it may be trimmed up whilst still in situ, and then after soaping it, similar sections can be cast on each side to support the molars and bicuspid.

These sections should extend to within about $\frac{1}{8}$ of an inch from the tops of the crowns of the teeth.

The next step is to make the crown section, which covers the crowns of the teeth and embraces the upper edges of the other three. As this is usually rather fragile owing to its shape, it is as well to strengthen it with a piece of stout iron wire. The sections are then removed, and the teeth and plate freed from wax, each section is then oiled, and that part which is to come in contact with the mineral body covered with tissue paper; this is done by wetting the tissue paper, and applying it to the plaster by means of a soft camel's hair pencil.

The sections are now placed in their respective positions on the model, and retained there by means of an elastic band. To give the mineral an additional hold to the plate, it is as well to brush it over with some gum enamel mixed thin with water. The mineral compound is mixed up into a paste with distilled water to which a little gum tragacanth has been added; this diminishes the friability of the uncooked mineral and makes it therefore more easy of manipulation.

Now place the molar and bicuspid teeth in their respective

positions in the sections on one side, and pack some mineral compound down beneath and around them.

That portion which is packed down to form the substance of the gum, should be mixed somewhat thinner than the rest, so as to flow into place easily, whilst that encircling the necks of the teeth should be drier in order to retain them more firmly in their places.

The molar region of the opposite side should then be packed, and lastly the front teeth inserted and treated in the same manner.

The object of the slight space between the teeth will now appear. If the teeth had been mounted close together it would have been impossible to have re-inserted them from the back.

When the packing is completed the whole is placed in a warm situation and allowed to dry gradually, after which the plaster sections are carefully removed and the teeth will be found to be retained in their places, the mineral having taken the form of the original wax.

The set is now ready for the first firing, and should be gently removed from the model, placed in a fire-clay dish, and covered with powdered sillex.

After gradually warming up to a good heat, it may be placed in the muffle of the furnace.

The completion of the firing is ascertained by means of a piece of clay tobacco-pipe stem, carrying a small portion of the mineral, which is placed in the muffle in close proximity to the work; this is examined from time to time, and on its assuming a partially glazed appearance, the work is known to be fired sufficiently, and is removed from the furnace, and placed in an iron oven to cool down slowly, carefully protecting it from draughts.

It is then examined, and if any flaws are present, it is as well to pack some thin mineral into them, and subject the case to a second firing.

The gum enamel is next painted on to about the thickness of a threepenny piece, and the case again placed in the fire-clay tray, but this time no sillex, or any other material, must come in contact with the gum, as it will of course become immovably vitrified to it.

After firing, the case is again allowed to cool gradually in the oven, and if perfect the edges are smoothed, the plate polished, and it is then ready for the mouth.

Mr. Rose then proceeded to explain the construction of a

continuous gum case with removable teeth, *i.e.*, not vitrified to the gum, so that the repair of such a case does not entail any more trouble than is incurred in an ordinary vulcanite plate.

This he showed might be accomplished by slightly oiling the teeth before packing the mineral around them. They can then be removed from the sockets which they form in the mineral when the latter is fairly dry; and thus all the firing can be done without subjecting the teeth to any risks; they are subsequently fixed to the block by means of vulcanite. Mr. Rose also exhibited some cases in which the platinum did not extend across the palate, but was fitted over a base of vulcanite, the attachment being made by means of tags of platinum wire projecting from its inner margin, the pins of the teeth being also left free from mineral for the same object.

These cases had all the artistic qualities of continuous gum work as viewed from the front of the mouth, with the additional advantages of the lightness and fit of a vulcanite palate.

The lecturer illustrated his address by showing many beautiful specimens of all branches of Continuous Gum Work, and mentioned that he was greatly indebted to Mr. Cummings of Glasgow, and Mr. David Hepburn, of London, for the loan of a large number of interesting and artistic specimens.

On the conclusion of the Address the President announced that Mr. Rose would be most willing to answer any questions which might be put to him respecting Continuous Gum Work.

Mr. SPOKES asked Mr. Rose for his opinion of the petroleum blast furnace as compared with other apparatus. He (Mr. Spokes) considered that the specimens exhibited a remarkable amount of success; personally he was inclined to admire the specimens of socketed teeth on account of the ease with which the case could be repaired. As to the question of weight, he thought that some gold plates were heavier than the cases shown; the gum "facings" were very fine, and far in advance of section work.

Mr. GREETHAM asked for Mr. Rose's opinion as to the different makes of teeth, and their behaviour during firing.

Mr. W. R. HUMBY wanted to know why it should be customary to begin packing the porcelain body at the two ends of the case, why not commence at one end and work round,

or at one central, and so pack each way? The weight of the platinum must militate against the success of the case, therefore he considered the gum facings the most satisfactory. He had noticed that there was considerable difficulty in obtaining gum teeth from the different depots, and this fact would no doubt help on the advancement of Continuous Gum Work.

Mr. ALFRED SMITH thought that an immense advantage was being able to use the ordinary pin-teeth on account of greater scope in colour, shape, etc. He considered gum facings the best of the several processes.

Mr. ROSE, in answer to Mr. Spokes said that he should always feel indebted to Mr. Humby for bringing the Petroleum (Nelson's) furnace to his notice, especially as one is always liable to have the case discoloured by the fumes when using the ordinary coke furnace. The Petroleum furnace went satisfactorily through a very severe test at a meeting of the British Dental Association which was held some time ago at the National Dental Hospital. This furnace was very simple in its action, and the only objection to it was the noise.

Mr. ROSE then showed the first "socket" case he had made. As to the question of weight, he mentioned the American experiment of substituting plates of different materials in the mouth of a blindfolded patient, who was unable to detect any difference.

In reply to Mr. Greetham, the lecturer said that he had found that White's teeth stand a higher temperature than most others, although Ash's answer admirably; Massey's teeth very easily crack in all directions during firing; the D. M. Co.'s teeth require care in using as they are more fusible than Ash's. His reason for packing in the region of the molars first was that there was usually more bulk of material required there than in other places. He was of opinion that gum facings would be the thing in the future on account of lightness, fit, etc. He would conclude by mentioning that gum section teeth could be made as required in the same way as the entire cases.

The PRESIDENT then moved that a very hearty vote of thanks be accorded to Mr. Harry Rose for his lucid address; this was carried, and the meeting adjourned.

Dental News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

The following were the questions in the written portion of the recent examination for the diploma in Dental Surgery.

ANATOMY AND PHYSIOLOGY AND SURGERY.

2 to 4 o'clock, p.m.

N.B.—The Candidate is required to answer at least one of the two questions, both on Anatomy and Physiology, and on Surgery and Pathology, unless he is entitled by the Regulations to exemption from any of those subjects.

Anatomy and Physiology.

1. What bones enter into the formation of the Orbit? Enumerate the foramina and fissures which communicate with the orbital cavity, and the structures which pass through them respectively.

2. Give the origin, course, and distribution of the arteries and nerves which supply the roof of the mouth and the upper alveolar arch.

Surgery and Pathology.

3. What are the causes, symptoms, and treatment of Abscess in the Antrum of Highmore?

4. Describe the manner in which a wound of the soft parts heals (*a*) without, (*b*) with the formation of Pus.

DENTAL ANATOMY AND PHYSIOLOGY AND DENTAL SURGERY.

5 to 8 o'clock, P.M.

N.B.—The Candidate is required to answer at least two of the three questions, both on Dental Anatomy and Physiology and on Dental Surgery and Pathology.

Dental Anatomy and Physiology.

1. What are the normal forms of human molars? What differences occur in various races of mankind, and what portions are the first to be suppressed?

2. What are the formative cells of the different tissues of the human tooth, and what part do they respectively take in calcification.

3. Give examples of functionally edentulous animals. What takes the place of teeth in these animals?

Dental Surgery and Pathology.

1. Describe the process of healing from the moment of tooth-extraction to its entire completion. What complications may occur, and how may they be guarded against?

2. What properties in filling materials are necessary in order to obtain the best results? Point out the disadvantages peculiar to the several materials in ordinary use, and say how you would combat them.

3. Under what circumstances would you desire (i) nitrous oxide, (ii) nitrous oxide followed by a few inspirations of ether, or (iii) ether to be administered? What are the dangers attending the employment of each.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

The following candidates passed the First Examination for the License in Dental Surgery:—David Johnston Cameron, Kincardineshire; John Morris Stewart, Edinburgh; John Morison Hood, Edinburgh; John Kirke Nash, Edinburgh; William Gardner, Edinburgh; Archibald Roland Maclean, Portobello; James Dalgleish Hamilton Jamieson, Edinburgh; John Norman Macdonald, Lincoln; Herbert William Kaiser, Birkenhead; Robert Ranleigh Jones, County Carnarvon; Edward William Albert Jeffery, Hastings; Matthew Rodway Leeming, Salford; and John Walter Horne, Slamanan.

The following candidates passed the Final Examination, and were admitted L.D.S. Edinburgh:—Lilian Murray, London; Henry Alfred Coleman, Wrexham; John Alexander Young, Edinburgh; Ralph Carr, Newcastle-on-Tyne; Seymour William Nicholas Swales, Sheerness; and John Douglas Logan, Dublin.

ROYAL COLLEGE OF SURGEONS IN IRELAND. DENTAL EXAMINATION.

Mr. Thomas St. Johnston, Birmingham, having passed the necessary examination has been admitted a Licentiate in Dental Surgery of the College. The next examination is fixed to take place in November.

APPOINTMENT.

J. Maxwell Wood M.B., C.M., L.D.S. Edin., has been appointed honorary Dental Surgeon to the Dumfries and Galloway Royal Infirmary

British Journal of Dental Science.

No. 658. LONDON, JUNE 15, 1895. VOL. XXXVIII.

DENTAL MECHANICS. DENTAL LABORATORY.

By HARRY ROSE, L.D.S. Eng.,
Lecturer on Dental Mechanics, National Dental College.

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Continued from page 500.

Copper, melting point about 2000° Fahr.

Before the introduction of zinc for dental dies, an alloy of copper and zinc called brass was used for this purpose.

Brass is composed of about two thirds copper and one third zinc ; a small percentage of lead is said to improve it.

Brass may be melted and poured the same as zinc, that is in the ordinary sand used for the purpose, but it is as well if one wishes to get the best results, to have a good head of metal for the die to contract from. This can be effected by placing another casting ring full of sand on to the one containing the model, and cutting a bell-shaped cavity in the upper ring tapering down until it comes to the back of the plaster model. The model is then removed and the upper ring adjusted to the lower and securely cemented to it by sand, the melted brass can then be poured through the open-

ing on to the sand impression, and when hard and the casting removed and cooled, the bell-shaped piece of brass may be sawn off. It must be mentioned that the sand impression should be smoked, and a good carbon surface produced on it by burning resin. This greatly improves the surface of the casting. Brass models or moulds if required are much more economically produced by sending them to a brass foundry and getting them cast in fine brass at so much per lb.

There are other alloys of copper such as gun metal, bell metal, speculum metal, etc., but they are not frequently used in the Dental laboratory.

Copper used as an alloy for gold, increases the hardness of the latter, and in certain proportions forms what is known as spring gold.

It also imparts a reddish colour to the noble metal.

Meter Metal.—This is composed of tin, antimony, and lead, it is used in the dental laboratory for making matrix and polishing plates. It possesses certain valuable properties that enable it to be blown up in the steam swager, (see section on Vulcanite Work.)

With this machine steam pressure can be brought to bear on a thin diaphragm of this metal, and being brought to its softest condition by the heat of the steam, it is gradually forced up on to the surface of a model placed in the upper part, and accurately copies and adapts itself to its surface. The scraps of this metal that are cut from the swaged plate, should be saved; they may either be remelted, or used for small castings, for which the metal is very suitable. Owing to its fusibility, it may be melted over a Bunsen burner.

Babbitt metal is a patent alloy of copper, tin, and antimony. The best formula is stated to be that of Dr. Haskell, which consists of Cu. 1 part, An. 2 parts, Sn. 8 parts. This alloy is nearly as hard as zinc and has less shrinkage. It is used to finish the swaging of a plate after being nearly completed

on the zinc model. As this alloy fuses at a lower temperature than lead, it is necessary to have a counter die in which Sn. forms a part, such as Pb 5, Sn 1. The die should also be quite cold and covered with a coating of whiting, before inserting it in the molten metal.

In making the alloy the Cu. is first melted, then the antimony and tin added.

Cast Iron. Melting point about 2057 Fahr.

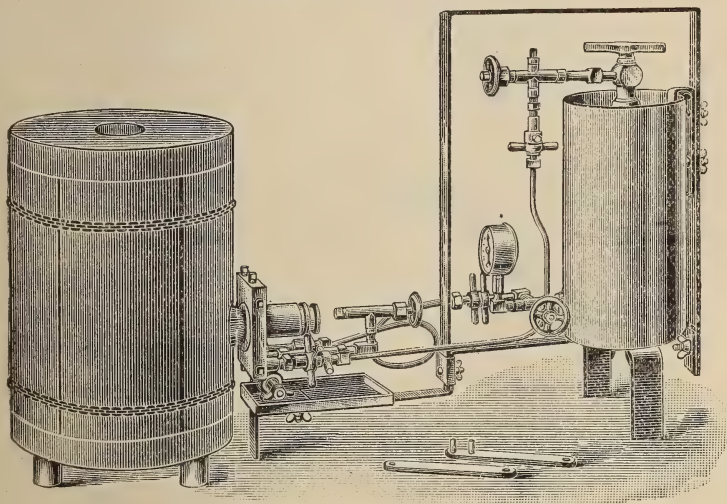


Fig. 50.

This metal has too high a fusing point to come into general use in the dental workroom for the purpose of making dies for swaging up plates, although the small amount of contraction it undergoes in comparison with zinc, seems to mark it as the ideal material for this purpose.

Mr. Fletcher explains in his Metallurgy how it may be cast by the dentist the same as ordinary zinc metal, and further states that one iron die would be alone necessary as against the two or perhaps three generally used in zinc.

That it can be utilized for this purpose the author has proved, having successfully cast iron dies, melting the cast iron in the furnace described and illustrated in the earlier part of this treatise.

It can be melted readily in Fletcher's injector furnace, and a large quantity can be fused, say eighteen or twenty pounds, in one of Nelson's furnaces using the Petroleum Blast, in about half an hour. (See Fig. 50). There is not the slightest doubt that better results could be obtained by sending the model to the iron founders, but as time is often an object in dental work, it would render this latter a serious disadvantage.

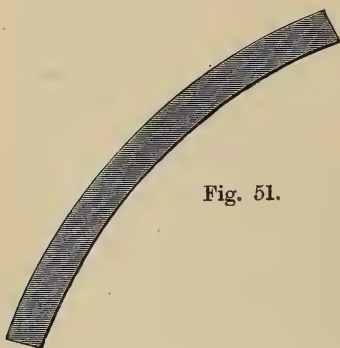


Fig. 51.



Fig. 52.



Fig. 53.

During the process of melting, the surface of the metal should be covered by a layer of charcoal or sawdust to prevent oxidation.

For further information on this subject the student may read with advantage the article on cast-iron in the work previously referred to.

It might perhaps be mentioned here that the contraction in a zinc cast may be regarded as an advantage, inasmuch as it, to an extent, counteracts the effects of the expansion of the plaster model.

Instead of padding the zinc model to counteract this, it has

been the author's custom to try the plate in the mouth, utilising it at the same time for obtaining a correct articulation, and he has found as a rule, that the gum, not like the rigid plaster model—yields sufficiently to allow of the plate going perfectly home, the contraction in the zinc making if anything a tighter fit.

If after trying the plate in the mouth this fact is established it only remains to trim a little from the plaster model to allow the plate to go into its place.

Bismuth, fusing point 466 F. is a most useful metal inasmuch as it readily mixes with lead and tin, and forms a class of alloys known as fusible metal. Of these the two following are the most important.

The first is known as Newton's fusible metal and is composed of Bismuth eight parts, lead five parts, and tin three parts, and fuses at 202 F. just ten degrees below the boiling point of water, in which it may be melted prior to using. Dalton's fusible metal fuses at a still lower temperature namely 197 F. and is composed of Bismuth ten and a half parts, lead five, and tin three parts. The addition of Bismuth to lead and tin alters the character of both these metals, rendering them more brittle; the alloys also expand considerably on cooling. Solder, pewter, and other alloys used in the arts, contain Bismuth.

It is much used for making patterns or castings of such small objects as teeth when extreme sharpness of outline is necessary. It may also be used for making the patterns for an artificial velum.

By duplicating the gutta percha patterns of the velum after adjustment to the mouth, in fusible metal, one is enabled to file up and produce much neater patterns from which to cast the mould in which the soft rubber velum is to be vulcanized.

In a very interesting and instructive paper read before the British Dental Association in 1891, Mr. R. P. Lennox of

Cambridge, drew attention to a number of uses for this alloy.

First, as regards crown work. In this class of work the metal may be used, (1) to make a mandril for shaping the ferrule, (2) as a setting for a natural tooth to be used as a die for striking up crowns, (3) as a means of obtaining an extremely

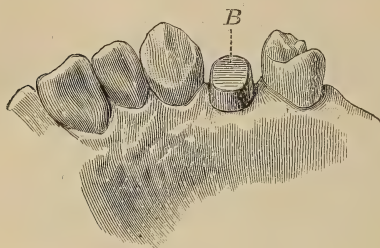


Fig. 54.

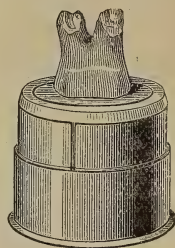


Fig. 55.

well-defined and not readily damaged cast of the mouth when a tooth is to be pivotted.

By referring to the illustrations very kindly lent by Messrs Ash & Sons, to whom I am also indebted for the directions for working, it will be seen very clearly how the different operations are carried out.

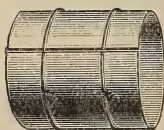


Fig. 56.

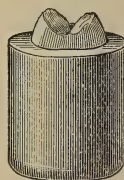


Fig. 57.

Fig. 51. Strip of copper cut to shape, for measuring the natural root, and obtaining a mandril for shaping the collar.

Fig. 52. The same after removal from the root.

Fig. 53. Mandril obtained from fig. 2 with pin and boss A.

Fig. 54. Shows Fig. 53 in situ at B on the plaster model, ready for use in shaping the gold collar to which the crown is to be soldered.

Fig 55. Shows mould A holding a split copper ring filled with King's Crown composition, in which is embedded a natural tooth crown downwards.



Fig. 58.

Fig. 56. Shows a second split copper ring which is placed over the tooth in fig 55, and into which fusible metal is poured from the cup, fig. 59.

Fig. 57. Shows the crown die thus produced.

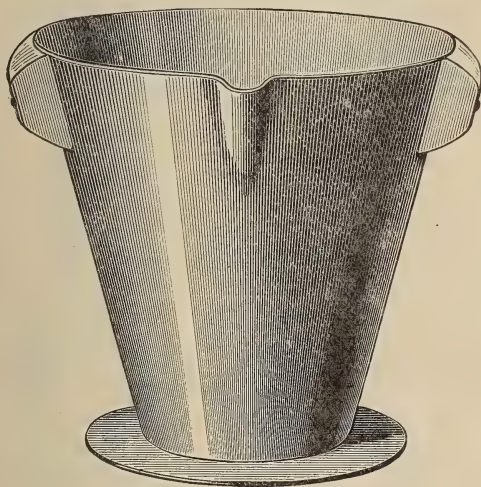


Fig. 59.

Fig. 58. Steel Punch drilled out at C to receive Crown die Fig. 57.

Fig. 60. Shows a method of securing the crown to the collar by means of a piece of binding wire for the purpose of soldering.

Fig. 61. Pair of pliers for grasping and bending copper strip around molar teeth.

Second. For making an articulator. It is claimed that this possesses many advantages over the old plaster slab bite which it is meant to replace. Directions for making the articulator. Trim the models so that, when articulated, their backs will sit comfortably in the square tray (Fig. 62). Fix the small oval tray (Fig 63) by means of the split tube and disc (Fig 64) in the centre of the tray (Fig 62) trim the models and adjust the tray (Fig 62) so that it will pass between the models.



Fig. 60.

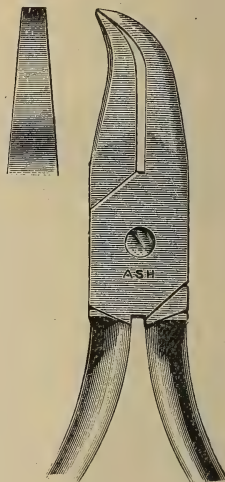


Fig. 61.

If using the tray for the first time paint all the interior with rouge and water.

Place the square tray (Fig 62) in a shallow pan of water, put in as much fusible metal as will when melted, from a half to three parts fill it. Make the water boil, and when the metal is melted, remove the tray from the pan, pour away the hot water, replace the tray in the empty pan, insert the model in

the molten metal, and pour cold water into the pan to hasten the cooling.

Remove the models, and the split tube and disc (Fig 64), turn out the slab from the tray (Fig 68) and push out the small oval tray from the centre.

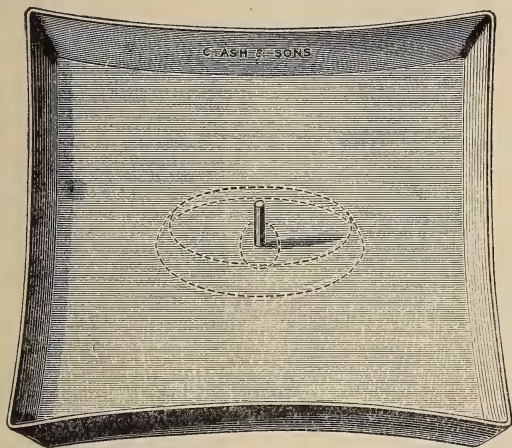


Fig. 62.

Of course the backs of the models must be so trimmed or made up with clay before investing as to be capable of removal from the metal slabs (see Figs 65 and 66.)

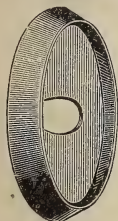


Fig. 63.



Fig. 64.

Third. Mr. Lennox uses this metal to form a base plate on which to mount composition for obtaining the articulation or bite, and also for mounting the teeth up in wax, and trying the case in the mouth. For both these purposes the

rigidity and fit of the plate makes it peculiarly suitable. In

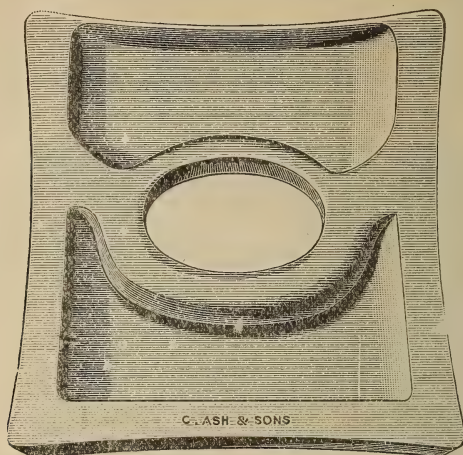


Fig. 65.

the first operation, that of getting the bite, the primary object

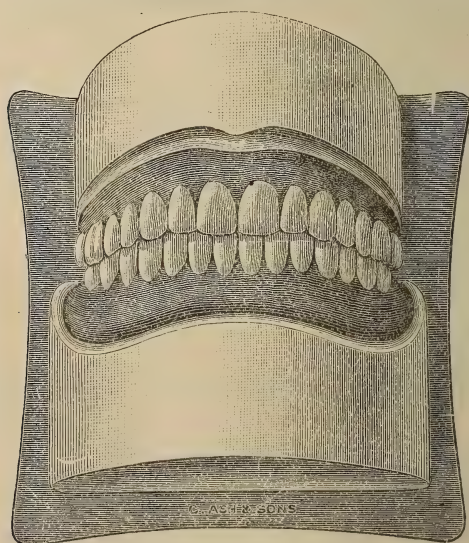


Fig. 66.

to insist on is that the plate can, after the operation in the

mouth is finished, be replaced again on the model, in as perfect a condition (that is as good a fit) as it was at first.

He describes the process as follows :—A wax plate is fitted to the usual plaster model and trimmed to the size of the desired metal plate. The wax is then French chalked, and thickly covered with King's Crown Composition. When this is set the wax is removed, and fusible metal poured in to take its place.

For the various other purposes for which this fusible alloy can be utilised, the author would recommend the reader to the paper on the subject, or to the clear and concise descriptions in Ash's Quarterly of March, 1895.

(To be continued.)

CROWNS.*

By GEORGE O. WHITTAKER, L.D.S. Eng.

Gentlemen,—You are all aware that there are a great variety of crowns, and many ways of adjusting and attaching them. I propose to confine myself to a description of the method of crowning which I propose demonstrating before you this evening. First I proceed to take an impression with "Stent" of the root proposed to be crowned, and adjacent parts, first cooling the compound a little in cold water, and then heating the surface over a spirit lamp before inserting the composition in the mouth. This method enables one to get a sharp impression of the root, with the gum slightly driven away. From the plaster cast I pare away round the neck of the

* Read before the Manchester Odontological Society.

root. We now proceed to fit a band of 22c. gold, No. 4 in thickness, in the usual way, leaving a good depth on the lingual, and about 1-16th inch in the labial side. A band so formed will nine times out of ten fit accurately the festoon of the gum and the root, which is to be prepared in the manner shortly to be described.

The patient who has kindly submitted himself to be operated upon this evening, is one of our students at the Victoria Dental Hospital, and he has lost the crowns of the central incisors and the right lateral tooth.

As it was impossible for me to demonstrate the whole process this evening, I have prepared the right central root and crown, soldering a lateral to the distal side, which I submit for your inspection before fixing on to the root.

The left root I have not touched beyond filling the root canal.

You will notice, gentlemen, that there is no pin in the crown, and it is not my intention to fix one in the other. I am aware that this will be severely criticised by some members of our Society, but it is my object in writing this brief introduction to invoke criticism, and to enable us to have a good discussion at our next meeting.

After having taken the impression, I next proceed to smooth the root with burs and carborundum stones, cutting down to the level of the gum at the labial wall, and leaving the lingual wall fairly high. I then take the smallest fissure bur, and make four or five grooves along the labial wall beneath the gum about 1-16th of an inch long, and the depth equal to the thickness of the bur at the gum edge and tapering beneath the gum, then by using an enamel trimmer, like the one I hand round, the intervening portions of enamel break easily away, thus saving an amount of time in preparing the root. Next I cut away the mesial and distal sides

of the root with a diamond disk, and finally smooth up with enamel trimmers and fine fissure burs.

You will notice I do not cut away my enamel from the lingual wall, and I maintain it is not necessary to do so, as the gold band can be better adjusted against the smooth enamel wall, and without injury to the gum and periosteum.

I slope the mesial and distal walls of the root freely, so that the band, which has been previously fitted to the model and very well contoured on the lingual side, is slightly longer in diameter, on its labio-lingual aspect, so that when placed upon the root (lingual side first) the edge is well against the enamel and beneath the gum. I now press the labial wall well beneath the gum with a strong foot plugger, and the sides of the root being on a slope, the more I press the gold band the tighter it grips the lingual and labial walls, tucking itself right beneath the gum and well against the root. It is especially necessary to have the lingual side of the gold band well contoured, as if this is not done we shall have had the gold band standing away from the root at the edge beneath the gum on the lingual wall, when the tooth is pressed well home.

I have here a large plaster of Paris tooth, and ring of soft, block tin, showing how well we can fit a band by preparing it the way I have described, and also a natural root fitted with a gold band for the same purpose.

I now select a tooth, put on the gold backing, and adjust the tooth, the outer or labial edge fitting the gold band, and resting on the root. Wax this in position with Ash's white stiff wax, and pull away the band and tooth with a fine probe pressed beneath the gum on the labial side, until caught on the edge of the gold band. The tooth may now be soldered in the ordinary way, and polished. During the time the crown is being soldered I undercut the root, and if necessary insert one of How's gold screws with the aid of the instrument provided for that purpose.

I also grind a little of the root away where the porcelain fitted against it ; by doing this it enables me to get the tooth crown well into position and against the gum edge, and the band grips the root much tighter, due to the sides of the root sloping. I could not get such a perfect grip if I had capped the root with gold beneath the porcelain tooth, and I do not believe there is any chance of the cement dissolving away between the gold and porcelain if the crown fits accurately. During the preparation of the root, and fixing of crown, I use a little powdered cocaine on the gum, which relieves all pain.

When the crown is finished and the outer side of gold band chamfered, I try it on to the root to make sure all is right. I then remove it, dry the crown and root with absolute alcohol and hot air, fill the crown and undercuts of roots with thin cement, press crown on root, (lingual wall first), hold well in position until the cement sets, and then with a very fine probe pick out any cement from beneath the gum, and the operation is complete.

SWALLOWING OF A PARTIAL DENTURE WITH SUCCESSFUL PASSAGE AFTER ADMINISTRATION OF A CATHARTIC.

By J. MAXWELL WOOD, M.B., C.M., L.D.S.

M.W., æt. 18, a domestic servant in the employment of one of my patients awakened one morning with her artificial plate, which she wore during the night as well as during the day, missing. She made diligent search for it, but with no

success. Later, uneasiness in the epigastrium with slight colicky pain, forced the unpleasant conviction home to her, that she had swallowed it whilst asleep. Scarcely realizing the significance of the situation she confided her story to her mistress, who immediately sent off for the family medical attendant, and meanwhile, whilst waiting his advent, she administered, of all things, a sharp dose of castor oil.

The plate was made by myself, and I was able to show Dr. F. its exact size and the nature of its attachments. The attachments were two short blunt gold bands, and the plate itself measured $1\frac{7}{8}$ ins. by its longest diameter, and $1\frac{1}{4}$ ins. by its shortest, forming as one can readily understand, a foreign body, whose presence might effect the most disastrous results.

Dr. F. in possession of these particulars proceeded to the house, when to his relief, and no less astonishment, he found that the plate had been passed with very little inconvenience to the patient, and that, within one hour of the administration of the castor oil. She is once more happy in the possession of her plate, but no longer wears it at night.

May we not take the narrow escape of this young girl as a lesson to ourselves, to persistently urge the removal at night of dentures which are at all loose.

TO SAVE THE BABIES.—The French Government, despairing of any hope to increase the birth rate of that country, is now devoting its energies to saving those already born. The new law forbids, under a severe penalty, any one to give infants under one year any form of solid food unless such be ordered by a written prescription, signed by a legally qualified physician.—*Medical Herald*.

British Journal of Dental Science.

LONDON, JUNE 15, 1895.

THE GENERAL MEDICAL COUNCIL.

The latest numbers of the Medical Journals contain reports of the proceedings of the May meeting of the Medical Parliament, and we publish elsewhere some of the transactions interesting from a dental aspect. Beside the control of the Registers, the functions of the Council embrace the regulation of the curriculum, the inspection of Examinations, and the exercise of certain penal powers which seem just now of much interest. The published reports of the Council meeting do not, however, convey a full impression of the amount of work done. Sir Dyce Duckworth has, incidentally, given the members of Committees a good character; they attend "excellently well," and outsiders are not aware of the great quantity of work done in these committees. "The heaviest, gravest, and most important issues that the Medical Council had to decide were dealt with in Committee."

The President in his opening address alluded to the visitation to the Dental examinations. Mr. Charles S. Tomes, F.R.S. has been charged with this important task; at present he has only been able to report upon the examinations of the Faculty of Physicians and Surgeons of Glasgow, but those of the other dental licensing bodies will be visited during the present year. Applications for registration from gentlemen holding the diploma of D.D.S. were refused, and upon the ground that they were unable to show that they had fulfilled a similar curriculum to that imposed by the Council upon British subjects. This is surely a matter that the applicants can rectify if they consider an entry upon our Register of sufficient value, but we have recently quoted

authority to show that under existing rules in America, it is possible for a man to complete his education without devoting more than twelve months to actual study. From a letter addressed to the Council by Dr. John Smith, of Edinburgh, it would appear that the hospital surgical practice in the Scotch dental curriculum now accords with that obtaining elsewhere, but the opportunity was taken to draw attention to the lax requirements as to instruction in other subjects, such as *Materia Medica* and Chemistry. It is satisfactory to find that the Dental Fund shows an increase in the receipts of over £60. The expenditure was £521, leaving a balance of £150.

Amongst other matters of interest to us, was one arising out of a re-arrangement of Committees. It was decided that there shall be a new Committee dealing with Dental Education and Inspection, its Report to be presented at the May Sessions. It will consist of six members; probably two will be appointed from each division of the kingdom. In consequence of the resolution enabling dental students to register on the commencement of their pupilage, those who have until now been refused should make application to have their registration antedated. Some of our readers may be interested in pupils who may be glad of this suggestion. The solitary penal case is reported on another page, and, if the information by any chance percolates to the individual most concerned, we feel charitable enough to hope he may derive some small satisfaction when learning that the Council deliberated solemnly in private before deciding to erase his name.

SKULL MEASUREMENT.—Sir Thomas Browne, who died in 1682, asked, "Who knows the fate of his bones, or how often he is to be buried?" His skull now reposes in the pathological museum of the Norfolk and Norwich Hospital, and its measurements have been recorded by Mr. Charles Williams. The skull is in a state of excellent preservation;

it is quite edentulous, and when determining the length of the face, an allowance of 0.6 in. was made for the absent teeth, and absorption of alveolar processes. The width of the lower jaw at the angles was 4 inches.

THE RED BLOOD - CORPUSCLES.—Dr. Carl Heitzmann, of New York, is well-known in connection with his histological work upon the dental tissues and is the founder of a school whose views, at present, do not meet with acceptance. He has also investigated the blood, and, as the guest of the Vienna Medical Society, recently read a paper on his researches. According to a statement in the *Lancet*, he was the first to prove that the red-corpuscles possess a reticular structure. When treated with chromate of potash they show amoeboid movements, and half an hour later filaments reticularly interwoven pass through the inside of the corpuscles, the hæmoglobin being enclosed in this network. The red blood-corpuscles, therefore, possess life as protoplasm, the reticulum exactly representing the living matter. Where much living matter is found the constitution of the individual is good. Dr. Heitzmann infers the nature of the constitution from the quality of the reticulum, and has been able to predict the end of an illness three weeks in advance by means of microscopical examination. According to his view, the organism is a living continuous structure and not an aggregation of individual cells.

DOCTOR DENTISTS IN FRANCE.—The Syndicat des Dentistes de France recently prosecuted two foreign dentists for using the prefix "Dr.," and it was ruled that anyone doing this who did not possess the M.D. degree of a French faculty could be punished. It appears, however, that if the dentist indicated in his advertisement the origin of his degree, he would escape the fine of one hundred francs and the nominal

damages of one franc claimed by the prosecuting association. No doubt this lesson will be properly appreciated, and, of course, it will not prevent the title being assumed in society. In connection with this, a friend of *The Lancet* correspondent in Paris, who was the guest of an American lady, was astonished to find that almost every other gentleman was announced as "Dr. So-and-So." It turned out that all these graduates were American dentists.

PHYSICAL REQUIREMENTS OF THE PUBLIC SERVICES.—We fancy we have heard something as to the lowering of the dental standard by recruiting officers, but there is no doubt that the condition of the teeth is still regarded as a matter of importance. Dr. Kenneth Macleod says that military and naval authorities will not willingly accept weedy, edentulous, or purblind officers or men when they can get robust youths with good instruments of mastication and sight. Dealing with the examination into the Digestive System, the same authority holds that the teeth must be carefully overhauled. They evidence soundness of the constitution or the reverse, assist in the determination of age, and their efficiency as organs of mastication is often put to severe test on service. The Army regulations require that "the teeth are in good order, loss or decay of many being considered a disqualification." The Navy regulations specify "many unsound teeth and unhealthy gums as a cause of rejection." The loss or decay of ten teeth disqualifies for the Navy, but the general condition of the whole set is also scrutinised. It cannot be too strongly impressed that a periodical inspection of the teeth of young persons should be made by a professional dentist, and faults remedied as they arise. Artificial substitutes are not accepted in the Army or Navy, even when the loss, if excessive, has occurred through injury and the gums are sound.

SOME ADVERTISEMENTS.—Here are two interesting, not to say suggestive, ones. "DENTISTS. Instructions wanted in the administration of nitrous oxide, also a few lessons in

method of gold-fillings: only one week available. State terms to Dens." This eager student hails from Sydney and perhaps should not be blamed for his anxiety to qualify himself for the public service. But how about his patients? We must hope they, too, may benefit by the little knowledge which is proverbially dangerous. The other advertisement is from a medical paper nearer home. It is addressed to medical men by a Licentiate in Dental Surgery practising in the West End. He desires to "work with" two or three Medical Men upon terms to be agreed upon, and offers the highest references. We have always understood that such deliberate arrangements were not ethical, and that medical men would scorn to recommend "on commission," patients to a dentist whom they only knew financially; we have not noticed the advertisement repeated; perhaps one insertion was sufficient.

AN UNUSUAL CONDITION OF THE FAUCES.—Dr. Robert Fullerton has described a case in *The British Medical Journal* which was probably congenital in origin. An examination of the woman's mouth showed an opening in each of the anterior pillars of the fauces. On the left side the soft palate was found not to divide in the usual way into an anterior and posterior pillar, but passed down as a single band in the position of the anterior. Towards its lower attachment it becomes somewhat expanded and slightly directed backwards. Separating this band from the buccal wall is an elongated opening, which begins above on a level with the base of the uvula, and extends downwards to the gums. The posterior pillar on this side appears, therefore, to be absent. On the right side of the fauces there was a similar condition of parts, but here the band representing the anterior was somewhat broader, and the opening external to it rather larger than that of the opposite. Moreover, there was in addition a narrow strip of mucous membrane arose above from about the usual point of attachment of the posterior pillar with the soft palate, and passed downwards to its insertion below.

Reviews.

Dental Microscopy. By A. Hopewell Smith, L.R.C.P., Lond., M.R.C.S. Eng., L.D.S. Eng. London : The Dental Manufacturing Company, Ltd. Philadelphia, U.S.A. : The S. S. White Dental Manufacturing Co., 1895.

This book should rank as one of the most important Dental literary productions. The time was ripe for such a publication, and Mr. Hopewell Smith was the man to do the subject justice. His communications to the Odontological Society, and elsewhere, are well known, and his former work in histology at Charing Cross Hospital enabled him to speak as one having authority. Dental Students will welcome this work as providing them with all the details and processes which they are now expected to know ; but practitioners who take an interest in the more strictly scientific side of their profession (and they are increasing in numbers) will find Mr. Hopewell Smith's book of the greatest use. Apart from the text and ordinary illustrations, the eight lithographic plates reproduced from the author's original drawings are, in our opinion, alone worth the price for which this excellent book may be purchased.

World's History and Review of Dentistry. By Herman Lennmaln, D.D.S. Chicago : W. B. Conkey, Company, 1895.

This book is full of interesting information as to the regulation of the practice of Dental Surgery in different parts of the world. It seems to have been compiled from the most reliable and authentic sources available. No doubt the work has been extended over some time to get it complete, and this may account for the 1892 Register being quoted under the Great Britain heading. The Editor is to be congratulated on the completion of an arduous task, and the Profession upon the production of a useful book.

Abstracts of British & Foreign Journals.

MECHANICS IN BRIDGE WORK.

By EMORY A. BRYANT, D.D.S., Washington, D.C.

Outside of general pathological conditions, which must be taken into consideration in operations of this description, certain mechanical principles and demonstrated facts are the real basis upon which such structures must be made if a reasonable success is to be anticipated, the abandonment of which means ultimate failure in the majority of cases. That these mechanical principles are not always the base of the construction of dentures of this description is very easily proved by the illustrations of various cases presented to the profession through the medium of our dental journals, as well as by books published referring specially to this branch of the dental art. To the eye of a mechanic, they do not even need practical demonstration to condemn them *in toto*. That they are not all failures is not the fault of the construction, but due to "favouring" the appliance upon the part of the person wearing the denture, or absence of antagonizing teeth, in both instances relieving the structure from the strain it should be designed to undergo.

Bridgework in dentistry is the building of an artificial denture *over* a space from which the natural teeth have been extracted, to teeth or roots of teeth remaining in the mouth, using the same as abutments therefor, depending upon the abutments for its stability and position, and not upon the gums or tissues beneath. All classes of so-called bridges not filling these requirements are not bridges in the true sense of that word, and should not be classed as such. Artificial dentures of any description held in place with clasps or bands, by slots or gibs or modifications thereof, the body of which depends upon the gum for its stability or support, is not a bridge, but merely one of the many forms of plates. Bridges should not be confounded with these plate forms, nor should the failure or success of this class of work be attributed to bridgework, but relegated to the plate family, where it belongs. By placing this dividing line between plates and bridges we are able to give each its true value and defects, its successes and failures.

In the immovable structure we have and always will attain the best results, from the simple fact that it is not only immovable itself, but it retains its abutments in an immovable position, distributing any unequal strain brought to bear upon it in any direction, equally upon all its abutments. Lateral strains are the most to be feared, and are what destroy the abutments, should they not be strong enough. A bridge extending from the wisdom, or the twelfth year molar, to the first bicuspid or cuspid, unless favoured by an unusual bite of the antagonizing teeth, will almost invariably fail, the abutments becoming loose under the lateral strain, while if it extends beyond the cuspid as far as the central incisor or farther, these latter abutments serve to break the lateral strain, and such a bridge, properly made and articulated, rarely fails. This same fact is demonstrated in bridges of a full denture attached to only four abutments, viz., the two cuspids and a molar on each side of the arch. In case the full denture is attached to a wisdom tooth on each side in the superior arch, it is best to solder in a piece of iridio-platinum plate, fitting and slightly embedded in the tissues across the roof of the mouth and soldered to the wisdom crowns, making it stiff enough to thoroughly brace the bridge at this point, so that any lateral strain will be distributed instead of concentrated upon one side or the other. This is of course impossible where the denture is in the lower jaw, but it must be arranged for by strengthening the denture at its arch from cuspid to cuspid and where the bridge joins the arch at the cuspids. Perpendicular strain has no ill effect upon the abutment crowns whatever if these abutments are firm, when the bridge is inserted.

The only reason that can be advanced for the "give" or slight motion which can be detected in the fully developed teeth, and which movement is at times used as an argument against the immovable bridge, is that the lateral strain is neutralized by this slight cushion action, the teeth returning to their normal position the moment the strain is removed, and that it is nature's brace and one which must be duplicated by mechanical means whenever these teeth are replaced by artificial substitutes. If we look after the lateral strain on the abutments used, nature will take care of the perpendicular. This statement is borne out by the fact that a loose tooth used as one of four or five abutments in a bridge, and securely held quiet, all lateral strain being removed from it although it is subjected to the same amount of perpendicular

strain as the other abutments, it becomes as firm in its socket as formerly in its normal condition, and even more so. Did not nature have this power of resistance, the greater strain always being perpendicular in the process of mastication, this loose tooth would become more loose, and by not giving resistance at this point the leverage would be so great that it would cause the bridge to tilt. Or, in other words, to have the same action as is found in the case of the abortions called "extension bridges," the extension acting as a leverage and virtually pulling the other abutments out of their sockets, distributing a lateral instead of a perpendicular strain to these abutments out of their sockets, distributing a lateral instead of a perpendicular strain to these abutments, thus accomplishing the very result we have to guard against mechanically, though in a different direction. Nature endows the parts of the body only with such strength of tissue as is required to allow normal action, giving no organ more than is needed for the function it is designed to perform, but endowing each part with a certain reserve force with which to resist abnormal action to a certain extent, as well as to be abnormally developed in certain directions, as in the case of the athlete, the sculptor, the mechanic, and the dentist. The whole structure of man, so far as the articulations of the bones of the body, limbs, head, and feet are concerned, in their normal condition is built upon the very finest of mechanical lines, as well as are the "braces," the muscles, and each and every part is endowed with reserve functions for the resistance of undue strain upon any part, and all we have to do is to study these mechanical effects and take advantage of them and success will attend our efforts. Systemic causes of failure apply to everything and have no especial relation to bridge-work from a mechanical standpoint.

With these mechanical facts to judge from as well as a personal experience of eight years with immovable bridges, the author is compelled to take the position that it is mechanically the "artificial denture par excellence" when properly constructed and inserted, due care being taken for the strength of the parts and material used and their relations to the tissues, and for all lateral strain, as nature will care for the perpendicular when required. If these mechanical principles are always followed, failure of immovable bridges from mechanical reasons will be an impossibility, leaving only bad cement, faulty insertion, systemic causes, and improper care by the

patient in not keeping it clean, to be contended with, and failures of this kind pertain not only to bridge-work, but to every operation known to dental science.

The Dental Digest.

THE EVOLUTION OF THE MEDICAL PROFESSION.

Continuing his studies of professional institutions in the *Contemporary Review*, Mr. Herbert Spencer this month traces the evolution of the physician and surgeon. He points out that in early societies the two functions of priest and doctor are normally united in the same person, the origin of the union lying in the fact that the primitive priest and the primitive medicine man both deal with supposed supernatural beings. Diseases are supposed to be caused by indwelling demons who have either to be driven out by making the body figuratively speaking, too hot to hold them, or to be ejected by superior spirits whose aid is invoked.

Mr. Spencer traces the idea, which still prevails among the uncultured, that a medicine is efficacious in proportion to its nastiness, to the belief in the diabolical theory of disease causation, and the methods used by the priestly mediciners to drive forth the fiend responsible for the trouble.

The separation of the medical from the sacerdotal function was gradually effected by the growth of civilization. The practice of medicine however, continued to be largely in the hands of ecclesiastics till the fifteenth century, both in France and in England. It was only when a papal Bull, promulgated in 1452, gave the physicians of the University of Paris permission to marry that the clerical practice of medicine began to decline.

The division of professors of the healing art into physicians and surgeons Mr. Spencer holds to be not the result of differentiation, but the maintenance of a distinction which asserted itself at the outset; the physician's province was the cure of evils inflicted by supernatural power, while the surgeon had to deal with injuries caused by human beings, by beasts, and by inanimate things. Of differentiation within the profession

itself, Mr. Spencer of course finds abundant evidence in the specialisation which had already reached a high degree among the ancients, and which now threatens to end in a portioning out of the body into minute allotments, each with its own cultivators.

In conformity with the normal order of evolution, integration has accompanied these differentiations,. Schools are established, unions and associations are formed, and medical journals are founded—all to safeguard the rights and promote the interests of the profession. From incorporation of authorised practitioners springs jealousy of the unincorporated. "Like the religious priesthood, the priesthood of medicine persecutes heretics and those who are without diplomas." Such a sentence, especially taken in conjunction with another passage in which he implies that the success of bonesetters is often greater than that of qualified surgeons, might lead a hasty reader to suppose that Mr. Spencer has a certain sympathy with quacks. The truth is simply that he looks both at licensed and unlicensed practitioners with the impartiality and detachment of the philosopher.

British Medical Journal.

SOLUTIONS OF IODINE.

By W. B. AMES, D.D.S., Chicago.

The use of solutions of Iodine in such agents as creasote, carbolic acid, and camphor-phenique are precluded by their objectionable odour. The most valuable solution of iodine resulting from my experiments has been that of oil of cassia. Pure cassia with iodine dissolved to the extent of 2 grains to the drachm by weight will make a syrupy solution, which seems to be a new compound differing radically from its components, being less irritant than either of the constituents. Its syrupy nature renders it easy of application to pulp canals. It is only slightly soluble in water, and yet such solution gives all appearances of being a potent germicide and antiseptic. From my use of this combination I feel

more confidence depending upon it as a dressing to be sealed up for months, or possibly permanently, than any dressing previously used. If pure cassia is used the mixture will become in time quite hard, so that it is necessary to make a fresh solution from time to time. This hardening or stiffening answers a useful purpose oftentimes when used as a dressing or pulp chamber filling as it becomes in that state almost insoluble. For the temporary setting of crowns, a solution that has become quite stiff can be used as so much cement or gutta-percha, softening it somewhat if necessary by immersing in hot water the bottle or jar in which it is contained, the material stiffening again when cold. If a crown fits a root accurately it is held most satisfactorily with this *antiseptic glue*. I have taken them off after being worn for several weeks, set with this, finding a thoroughly aseptic condition within. For this temporary setting of crowns it is a great success when used of the proper consistency. If it is desired to overcome the tendency to become hard in this mixture of cassia and iodine, a trace of terebene can be relied upon for the purpose. In the solution of 2 grains of iodine in a drachm of cassia, 1 or 2 per cent of terebene is sufficient, or by using a little more terebene, it is practicable to dissolve more iodine, obtaining probably a more potent mixture and the same syrupy consistency. For instance the following parts by weight might be used :

Pure oil of cassia	.	.	.	1	3.
Terebene	.	.	.	.	5 gr.
Iodine	.	.	.	.	5 gr.

By incorporating a sufficient quantity of a suitable insoluble mineral or metallic oxide with the cassia and iodine solution, a mixture similar to iodoform paste is obtained without the same disagreeable features.

It is extremely essential that the oil of cassia be pure. Many samples contain a sufficient proportion of other oils, especially that of cloves, to render the solutions of iodine unsatisfactory. The oil of Ceylon cinnamon is not as satisfactory for this purpose as the oil of cassia.

ERRORS.

There are methods in the operation of filling that are often carried to extremes which endanger the tooth substance or the physiological requirements of perfect health of the parts. The first instance of this error that may be mentioned is that of placing metals too near to the tooth pulp. As this tissue is nearly always inflamed by the near approach of caries, the placing of metallic substances in proximity to it subjects this delicate tissue to the shock of thermal changes in the metal, with the result of chronic inflammation and ultimate death of the pulp. In our day it is probable that a thick coating of cement is universally employed as a non-conductor over the pulp, but formerly it was the general practice to fill large cavities entirely with gold or amalgam, with only a thin layer of gutta-percha or a similar covering. This placing of metals so near the pulp often—in fact generally—led to the death of this organ in time. Indeed this sometimes happens even yet as the result of the violation of physiological principles, for a mass of metal must not be allowed to approach too near to the tooth pulp.

Another, a mechanical, error is that of building large fillings upon inadequate foundations with insufficient retaining strength. This results in the mass breaking away from the tooth or by caries supervening under the filling from the crushing or checking of the dental tissues. Over-large fillings are often made by the dental mechanic who is ambitious to produce a yet finer operation, but he takes no account of having overreached the limits of anatomical possibilities. Impossibilities are attempted, to make fine operations, which cannot help but fail in the nature of things.

Dr. Alton H. Thompson.

SEPARATION OF ZINC, COPPER, ETC.

H. N. Warren suggests a new method for separating zinc from copper and other allied metals, which consists in dissolving the alloy in strong sulphuric acid, adding a few coils of magnesium tape, and maintaining the solution at about

100° F., until the whole of the copper is precipitated. If tin, antimony, or other metals of the same group are suspected, the copper precipitate must be further examined. Any free sulphuric acid in the filtrate should then be neutralized by adding a strong solution of sodium acetate and raising to boiling point, when any iron present will be precipitated as tribasic acetate, whilst the zinc sulphate will be converted into acetate. Thick sheet or rod magnesium is next added to the solution, and hydrogen is evolved simultaneously with the entire precipitation of the zinc.

Chem. News.

DROPS.

Dr. Eder, in the following table, gives the number of drops required to make a cubic centimeter, showing the variations in the size of drops of different liquids :

Water	...	...	20
Hydrochloric acid	...	...	20
Nitric acid	...	...	27
Sulphuric acid	...	...	28
Acetic acid	...	...	38
Castor oil	...	...	44
Olive oil	...	..	47
Oil of turpentine	...	...	55
Alcohol	...	...	62
Ether	...	...	83

Scientific American.

SOME PRINCIPLES RELATING TO AMALGAM

By EDWARD C. KIRK, D.D.S., Philadelphia.

There can be no doubt that the best results obtainable in the formation of a dental amalgam will be those based upon the production of one in which all the constituents are chemically united in atomic ratios. Under these circumstances only have we the right to expect to produce an amalgam in which all the affinities of its constituents are satisfied, and

which for that reason will not be liable to physical or chemical change. An amalgam in which all the constituent elements are not chemically united is necessarily in a condition of stress and more subject to the influence of the chemical affinities of its environment, which perhaps slowly, but not the less surely, develop evidences of instability in the fillings made from it. While this principle has been recognized as an important and desirable one in the production of an amalgam, and though attempts have been made to practically utilize it in the preparation of amalgam fillings, the methods proposed do not seem to have achieved the object aimed at—viz., to secure an amalgam filling in which the chemical affinities of the constituent elements are mutually satisfied. As an aid to a clearer comprehension of what it is desired to achieve in this direction, let us examine for a moment the binary combination of copper and mercury, which we know as copper amalgam. Both copper and mercury being bivalent elements, their chemical combination would naturally be made up of one atom each, and the formula of the compound would therefore be CuHg . As a matter of fact, this atomic combination of mercury and copper has been found to exist. It may be made by bringing the two elements together with mercury in excess, allowing the compound to crystallize, and then squeezing out, by a pressure of about sixty tons per square inch, the excess of mercury. There are two other chemical compounds of mercury and copper theoretically possible, but they need not be considered here. It is only necessary to bear in mind that copper and mercury do unite chemically with each other in definite atomic proportions; that the compound is crystalline, and has the formula CuHg . It should be further noted that the atomic combination of mercury and copper, CuHg , is soluble in mercury, and that mercury may be added to it in considerable quantity without preventing its setting property or power of recrystallising after having been softened by heat. The copper amalgams which have been used as filling materials are probably, without exception, solutions of the atomic combination CuHg in an excess of mercury. This statement is borne out by the fact that the dental copper amalgams on the market vary considerably as to the amounts of mercury which they contain, and differ also as to the degree of heat required for their fusion. A further evidence of this feature of their structure is their behaviour when heated. The gradual application of heat to dental copper amalgam causes at first an exudation of

numbers of minute globules of a more fusible amalgam containing a large excess of mercury, which is followed by a softening of the whole mass. Again when the mass has been made plastic by heat and the kneading process, and after a few minutes have been allowed to elapse to allow crystallization to commence, the excess of mercury may be squeezed out through chamois with the pliers. These phenomena in the behaviour of copper amalgam furnish striking evidence that the amalgam is essentially a true chemical compound in definite atomic proportions, and that within very narrow limits any excess of mercury is an element of weakness, not only because such excess is left in a free, uncombined state, which renders it more easily acted upon by the oral fluids, but because the excess impairs the integrity of the filling itself, rendering it less capable of withstanding physical wear and tear.

Knowing the chemical valence and atomic weights of the metals concerned in the formation of amalgams, it becomes a simple matter of calculation to determine the percentage amounts required in each instance to affect a combination in atomic ratios. This is especially true of the binary amalgams but when several metals are used as constituents of an amalgam, the problem becomes exceedingly complex. Attempts have been frequently made to accomplish the synthesis of a complex metallic compound of this character, suitable for a filling material. The effort has resulted in various devices for adding an accurately weighed or measured quantity of mercury to a definite amount of alloy fillings, but I gravely question the accuracy of the result, so far as achieving a definite chemical compound is concerned.

I regard such a method of preparing an amalgam mass as inherently bad, both theoretically and practically. While the process alluded to is evidently based upon the expectation of securing an amalgam mass in which the constituents are united in atomic ratios, there is no evidence to show that the result is attained, and, on the contrary, there are very good grounds for believing that it is not. Admitting that the components of the alloy are so related to each other and to the mercury in number and amount that, when brought together under ideally favourable conditions, a perfect atomic combination would result, we are met with practical difficulties not as yet overcome when we attempt to bring about the combination. The alloy in the condition of shavings, filings, or coarse powder, is intimately mixed with the

measured quantity of mercury, and no matter how thoroughly the mass may be kneaded and worked, the selective affinity of the mercury will cause it to first seize upon that constituent of the alloy for which it has the strongest attraction, and thus satisfy itself before the mass is homogeneously amalgamated or portions of the alloy will be amalgamated only superficially. The result of this will be a mass which, when set, will consist of a magma of amalgam, which is a true chemical compound, holding in its structure particles of unamalgamated alloy. Such a mass is not only lacking in homogeneity, but favours the development of local electrical action within its structure.

The desirable end of producing an amalgam in which an atomic combination of its components is secured may, I believe, be brought about in a much simpler and more practical manner by taking advantage of the selective affinity of the mercury and utilizing it for the purpose. A simple chemical illustration will perhaps make this point clearer. If to a considerable quantity of dilute hydrochloric acid, we should add sodium carbonate solution in an amount not sufficient to neutralize the hydrochloric acid, we would have as the result a certain quantity of sodium chloride, formed by union of the two substances and dissolved in an excess of dilute hydrochloric acid. We could readily recover the sodium chloride from such a solution by removing the menstruum, which might be done by concentrating the liquid to the crystallizing point and separating the crystals from the mother liquor by filtration. In the process just noted, the sodium of the sodium carbonate added to the hydrochloric acid in excess has combined with only just so much of the chlorine of the hydrochloric acid as was necessary to completely satisfy their mutual affinities in the formation of sodium chloride, in accordance with the well-known chemical law that all combinations of elements take place in definite proportions by weight.

Now, we have seen that there is positive ground for the belief that amalgams, and especially those concerned in dental work, are essentially chemical compounds; it naturally follows that these combinations of mercury with the metals composing the amalgam alloy must take place in atomic ratios, and therefore in definite proportions by weight. It matters not whether the alloy be in excess or whether the mercury be in excess, the definite mercurial chemical compound is formed and its properties are modified by the excess of whichever elements or element remains over and above the amount needed to form the definite compound. We have now to consider

the two methods of manipulating amalgams which are commonly employed, and their relative values, in the light of the principle which I have just endeavoured to elucidate. Our objective point being to secure a definite chemical combination in atomic proportions, let us see to what extent the end is realized in each of these methods. If to a globule of mercury filings or shavings of alloy are added until a mass of proper working quality is produced, there is absolutely no guide whatever upon which the operator may depend to indicate to him the point at which the proper amount of filings has been added to exactly satisfy the chemical affinity of the quantity of mercury which has been employed. He uses his taste and judgment in producing a mass of proper working qualities. Now, taste and judgment are such extremely variable factors that they are worse than valueless as standards of scientific exactitude. Moreover, an amalgam mass of "proper working qualities" is not by any means the object for which the amalgam is being made. First, and beyond all other considerations, it is intended to produce a filling material which shall possess the most desirable features belonging to its class. Its working quality is, or should be, a minor consideration. The method of adding filings to the mercury is subject to another feature of inaccuracy—viz., that the filings are liable to be added in excess, so that the resulting mass is lacking in homogeneity and is liable to local electrical disturbance. It is, of course, clear that should the alloy filings be present in excess there is no possibility, from the nature of the compound, of directly getting rid of the excess of filings.

The method of weighing or otherwise measuring the amounts of mercury and filings employed, so as to secure uniformly related proportions of the constituents of an amalgam, is of course an improvement on the method just noted, but is still so lacking in accuracy as to have nothing to recommend it in comparison with the more common method of mixing amalgams and which we will now consider—viz., adding mercury in excess to the comminuted alloy and then removing the excess. By adding mercury in excess we have, of course, supplied all the mercury to the elements of the alloy with which they can combine.

We have also seen that these combinations of mercury with the metals take place in definite atomic proportions. The first phenomenon which we perceive on bringing together the mercury and filings is that solution of the latter has taken

place. If sufficient mercury has been employed, the mass will in a moment become of a soft, buttery, or pastelike consistency, which when rubbed between the fingers or in the palm of the hand, will not show the slightest trace of solid particles, for the reason that complete solution of the solid alloy has occurred. After the elapse of another short interval crystallization slowly commences, the mass thickens slightly, and when pressed carefully between the fingers, emits a peculiar softly grating sound, very much like that which may be produced by compressing a package of powdered starch. This sound is caused by the grating or rubbing of the crystals against each other, and is the analogue of what the Germans call the "zinn schrei" produced by bending a bar of pure tin in the hands. At this stage of the process we have a mixture of a definite chemical compound or compounds between mercury and the elements of the alloy in atomic proportions and crystallized, which is dissolved in its menstruum, the excess of mercury.

As it is our purpose to utilize only the chemical compound of mercury and the alloy as a filling material, the next step is to get rid of an excess of mercury. This up to a certain point is readily accomplished by straining out the crystals through the chamois-skin by compression with heavy pliers. All of the excess of mercury, however, cannot be removed in this way and the mass left in suitable working condition. It has been proposed, and the plan is pursued by some, to use portions of the mass soft or plastic, and to add to this other portions from which more of the mercury has been removed by greater pressure. This method is open to the objection that it does not remove sufficient of the mercury—*i.e.*, all that may safely be removed without endangering the integrity of the chemical compound of mercury and the alloy. The best method within my knowledge, and one which gives results superior to anything I have ever seen in the quality of the fillings produced by it, is to absorb the excess of mercury from the surface of the filling by means of crystal or sponge gold. The amalgam mass after crystallization has fully commenced, should be squeezed in chamois until an easily workable mass is produced. The amalgam is then introduced into the cavity and the filling built more than flush or full contour. Pellets of freshly annealed sponge gold are then rubbed into close contact with the amalgam surface by suitably shaped instruments. This process is continued as

long as any whitening of the gold will take place by contact with the filling. When no more mercury can be extracted in this way, the filling may be carefully burnished, and in a very short time—depending more or less upon the kind of alloy used—may be given a final polish.

International Dental Journal.

A POSSIBILITY IN TOOTH-FILLING.

By SIGEL ROUSH, M.D., D.D.S., Washington, D.C.

To apply the principle of electro-plating to the filling of human teeth may be a Utopian dream, but the writer in his experiments has obtained results sufficiently satisfactory to warrant him in believing it can be successfully accomplished. Electro-plating, as the reader doubtless already understands, is the process of transferring, by means of an electrical current passed through some disintegrating solution, infinitely small particles of one metal and depositing them on the surface of another body. The nature of the solution or bath varies with the metal to be plated and the kind of plating material to be used. The deposit thus formed is so close, the adaptation of the one metal to the surface of the other so perfect, that the two substances are practically made one, and mechanical force is hardly sufficient to separate them. A cavity filled by such a deposit would therefore be nothing short of perfection. Every irregularity of the surface walls would be absolutely and thoroughly filled. The microscopical particles of the filling material would even penetrate and hermetically seal the interstitial openings adjacent to and communicating with the main cavity. Adaptation would be so perfect that no undercuts would be necessary to retain the filling in position. Indeed, the writer has been able to deposit a filling on an almost flat surface sufficiently close to require considerable force to scale it off. Again, inaccessible portions of the cavity would be as perfectly filled by this method as the accessible ones. It would save labour; also material, for in large cavities cement or amalgam could be used first, and then over this a deposit of gold could be made. Root canals could be more perfectly filled. In short it would

prove an ideal filling in every respect. The writer has conducted his experiments thus far on teeth outside the mouth, and has obtained some most perfect and beautiful fillings. It will not be necessary here to go into detail as to the kind of solution used, strength of current employed, etc., but a short outline of a few of his experiments will be briefly noted. First, a tooth was taken and a clean cavity formed. Then with a solution of a metallic dust and some volatile fluid, such as chloroform or ether, with gold or copper paint the walls of the cavity. This forms a metallic base on which in the bath the filling is rapidly built up. For experimental purposes the liquid bronzing fluid answers all purposes. Or the cavity may be lined with sandarac, and the powder dusted over it. Almost any metal will act as a base. If another filling exists in the tooth it may be protected from the deposit by a coat of sandarac, or some other non-conductor. The deposit will only occur where the coating of metallic dust has been placed. If only a surface to the filling is desired, and if amalgam is used, fill as usual, and after hardening clean the surface of the filling and paint the edges of the cavity with the metallic solution, and subject to the bath and current. The amalgam will act as a conductor, and take on a good plating. If cement is used, fill and dust the surface before the cement sets, and afterward proceed as in the amalgam. To procure a filling in this manner outside the mouth is an easy matter. Now with the teeth *in situ* there are a few difficulties to be overcome, but it is the opinion of the writer that they are not insurmountable.

First. "To obtain an appliance to insulate the tooth to be filled, in a water-tight bag or cup." It is possible to do this by means of a rubber cup or tube fitted closely around the neck of the tooth. The opening to this tube may be outside the oral cavity. In order to watch the progress of the filling, a section of the tube may be of glass. In upper teeth the tube may be bent siphon-like, with the opening kept higher than the tooth. It would thus retain liquid. This would not be necessary in the lower teeth.

Second. "The fluid may be detrimental to the tooth-structure or poisonous to the patient." Both objections hold good in some cases, but for filling with gold, silver, tin, or nickel, a harmless fluid is obtainable.

Third. "It would take too long." A filling may be inserted in this way quicker than the average operator could do the work.

Fourth. "The current might be painful to the patient." The current sufficient to deposit such a filling is not perceptible even when passed entirely through the jaw.

Fifth. "Could a current be induced through bone-substance?" Very easily if moist. A small copper wire brought in contact with any portion of the tooth, or even by means of a damp sponge applied to the face over the tooth, would form a sufficient conductor.

Sixth. "Could the filling material be prepared in a convenient form?" The pure metal is all that would be necessary, prepared in strips or pencils to which one of the poles could be attached.

There may be other objections urged, but none seem insurmountable. The advantages over the present mode of filling are many, and it is the firm belief of the writer that in this way we may produce a truly ideal filling.

The Dental Cosmos.

PREPARATION OF ROOTS FOR CROWNS, ETC.

By Dr. ZAVIER SUDDUTH.

The rapid advance made in the conservation of the roots of teeth has been the result of a general desire to do away with plates and escape the fatigue of large gold fillings with their sure failure in time.

Dentistry has turned from the era of *Marshall Webb* to a more sensible treatment of restoration. To enter into the discussion of crown work other than to treat the subject and principle in a *résumé* such as this is desired to be, would be impossible. We must content ourselves with a few principles.

1. When more than one third of a tooth has been lost by decay or fracture and the root can be placed in a healthy condition, then it should be crowned. But how or with what kind of a crown depends upon the conditions presenting.

2. Porcelain or porcelain-faced crowns should be used in the front of the mouth, and shell crowns on molars and some bicuspsids, although in ladies' mouths I would advocate using

porcelain faces on bicuspid for the cosmetic effect. In all banded crowns the enamel should be removed with suitable scalers, and the band made of better than twenty-two carat gold and fitted snugly at the gum line, and allowance made for setting it higher, on the root at the final setting. By so doing, the band will be stretched by the increasing size of the root and thus made to fit very tightly. This method of fitting bands was adopted by the writer in 1880, and a set of enamel scalers devised at that time for the purpose of removing the enamel. These were shown at the meetings of several dental societies, and the manner of their use fully demonstrated. During the past winter we also advised the use of swaged aluminum crowns for practice work in college clinics.

Southern Dental Journal.

BISMUTH SUBNITRATE AND THE TEETH.

By D. B. DOTT, F.R.S.E.

The relative merits of oxynitrate and oxycarbonate of bismuth were recently discussed (The Chemist and Druggist, February 23, page 291), preference being given to the latter salt because of its existing in a less defined crystalline state, and so being less likely to cause irritation. The oxycarbonate is said to be the "more soluble," but that is one of those statements of the truth of which one would like to see the proof. Dr. Lauder Brunton says, in effect, that experience has proved that the subnitrate is the best salt of bismuth, whatever the reason may be.

It occurred to me that the custom which is common with many dyspeptics of taking an occasional dose of the oxynitrate would probably be injurious to the teeth from particles of the chemically basic, but practically acid, salt lodging about the teeth. Therefore, a piece of marble about the size of a tooth was placed in subnitrate of bismuth moistened with water. After twenty-four hours it was removed, washed, dried, and weighed. It had lost in weight 7 milligrammes. Replaced in the bismuth paste, and after twenty-four hours

again weighed, it had lost 5 milligrammes. Next day it had similarly lost 4 milligrammes. The same experiment was repeated with oxycarbonate, and after twenty-four hours no loss was indicated. Even after four days in the moist oxycarbonate there was no weighable loss.

It seems clear from these experiments that from a dental aspect (I won't say a dentist's) the oxycarbonate is the preferable salt.

MEDICAL SCIENCE AND THE MASSES.

Medical science is sadly hampered by the crude theories of the masses. Far as it lags behind other departments of science it dare not move forward as fast as it could or would if the public would let it. No doctor dare do for his patients the best he might because he knows it would mean instant dismissal from the case. A premium is set upon quackery by even well educated men and women. The most successful doctors are those who take more pains to treat the friends of the sick than they do to cure their patients. To please the well is the secret of success in medical practice. If it was possible to determine the proportion of successes to failures in the treatment of the sick by each medical man, the world would open its eyes in astonishment. It would be found that those whose patients most frequently recover are by no means the ones with the largest practice or who can command the largest fees. He is the most successful one whose personal appearance is pleasing who has the greatest ability in appearing to agree with the influential friends concerning the nature of the disease and the line of treatment. He must espouse their crudest notions and do nothing to shock their prejudices. Where his judgment tells him that nothing should be done further than establishing hygienic conditions he must pander to their folly and write a prescription. He always does the best he dare for the sufferers, but the amount of benefit he can bestow varies with the violence and character of the prejudices he has to meet. A man whose nature will not permit him to waver from what he knows to be for the best interests of his patients

is constantly the subject of adverse criticism and doubt. Where success promptly crowns his efforts he gets some praise. Where there is delay and no prompt signs of gain he is usually dismissed amid disrespectful criticisms from those he has failed to please.

Popular Science News.

TOOTH-WASH.

(1)			
Castile soap	...	...	13½ oz.
Water	...	...	3 lbs. 6 oz.
Dissolve by heat, add—			
Glycerine	...	...	36 oz.
Alcohol	...	...	3 lbs. 6 oz.
Oil of Peppermint	...	...	1 oz. 5½ drs.
„ wintergreen	...	...	1 „ 5½ oz.
Syrup	...	...	4½ lbs.
Tincture of cudbear	..	q.s.	

Filter.

A fragrant tooth-wash, for cleaning and preserving the teeth and gums, imparting a fresh taste and feeling to the mouth. Directions for use: Dip the brush in water (soft or rain-water the best), then pour a small quantity of the wash on it, and rub it on the teeth; it forms a froth in the mouth, which should be allowed to penetrate every crevice.

(II).			
Castile soap	.	.	3xiiiiss.
Water	.	.	3liv.
Glycerine	.	.	3xxxvj.
Alcohol	.	.	3liv.
Oil of Peppermint	.	.	3xiiij.
„ wintergreen	.	.	3xiiij.
„ lavender	.	.	3j.
„ cassia	.	.	3j.
„ cloves	.	.	3j.
„ sassafras	.	.	3j.
Chloroform	.	.	3ij.
Tincture of cudbear	.	.	3vj.

Macerate for several days, and filter.

Reports of Societies.

MANCHESTER ODONTOLOGICAL SOCIETY.

The ordinary Monthly Meeting of the above Society was held on Tuesday, March 5th 1895, at the Victoria Dental Hospital, Devonshire Street, All Saints, Manchester. The President, Mr. W. Dougan, in the chair.

APPLICATION FOR MEMBERSHIP.

An application for non-resident membership was read from Mr. Robert Watson, L.D.S. Eng., 4, Queen Road, Southport.

CASUAL COMMUNICATIONS.

Mr. David Headridge stated that a museum was being formed in connection with the Victoria Dental Hospital, of which he had been appointed Curator pro tem. The collection already included specimens of Dental Irregularities, Dental Abnormalities, Photographs, etc., and he appealed to members to contribute specimens to enlarge the collection.

Mr. DYKES exhibited a tumour removed from the mouth of a patient.

RECEPTION OF NEW MEMBER.

Mr. EDWARD LUND, who had been elected an honorary member of the Society, was present at the meeting, signed the obligation book, and was received and welcomed by the President on behalf of the Society.

Mr. GEO. O. WHITTAKER then read a paper on "Gold Crowns," which is published on page 539.

The members afterwards proceeded to the operating room of the Hospital and Mr. Whittaker gave a practical demonstration of the method of crowning he had advocated.

THE ADMINISTRATION OF NITROUS OXIDE GAS AND OXYGEN.

Mr. A. B. WOLFENDEN of Halifax demonstrated the use of the above mixture, twelve patients submitting themselves for the operation of tooth extraction. The apparatus used was Dr. Hewitt's improved and simplified apparatus, the bag for containing the Oxygen being enclosed within the larger N_2O . bag, with an indicator giving the operator the power of regulating the amount of oxygen given to the patient.

Dental News.

GENERAL MEDICAL COUNCIL.

MAY 29th.

Sir Richard Quain, President, in the chair.

Report from the Education Committee on the Registration of Dental Students.

Dr. BATTY TUKE: It will be in the recollection of the Council that last year we took away the right to register on pupilage for medical students. At the time, I confess, the fact escaped me that Dental Students should have power of being registered on pupilage, inasmuch as pupilage is an acknowledged and necessary part of the curriculum for Dental Students. The report, as now in the hands of the Council, simply contains the recommendation that "the registration of Dental Students shall be carried on at the Medical Council Office, in London, in the same manner as the existing Registration of Medical Students—as hereinbefore set forth—and subject to the same regulations as regards Preliminary Examination, but in the case of Dental Students professional study may commence by pupilage with a registered Dental Practitioner." I move the reception of that report.

Dr. McALISTER seconded the motion, which was agreed to.

The Report is as follows :—

Representations having been made to the Registrar that No. 20 of the "Resolutions in regard to the Registration of Medical and Dental Students" does not now permit of Registration of Dental Students on entering upon pupilage with a Registered Dental Practitioner, the President has directed the matter to be laid before the Education Committee.

Resolution 20 directs that "the Registration of Dental Students shall be carried on at the Medical Council Office in London, in the same manner as the existing Registration of Medical Students." A motion adopted by the Council on December 4, 1894 (*Minutes*, Vol. XXXI, p. 162), prescribes that Medical Students may be registered only upon entrance at "a University, School of Medicine, or recognised Teaching Institution." The usual practice for a Dental Student is to

commence study as a pupil of a Dental Practitioner, a course quite in consonance with the Resolutions of the Council, but the Registrar holds that he is not warranted in registering students commencing Dental study in this way, inasmuch as pupilage is no longer accepted by the Council as a qualification for the Registration of Medical Students.

In order to remove all doubt on the subject, the Committee recommend that Resolution 20, regarding the Registration of Dental Students, be amended as follows :—

“20. The Registration of Dental Students shall be carried on at the Medical Council Office, in London, in the same manner as the existing Registration of Medical Students—as hereinbefore set forth—and subject to the same regulations as regards preliminary Examinations, but in the case of Dental Students professional study may commence by pupilage with a Registered Dental Practitioner.”

JOHN BATTY TUKE.

Sir PHILIP SMYLY : May I ask, Why should not the Branch Councils register these students ?

Mr. MILLER : Dental Students are all Registered at this office under the Dentists' Act.

Dr. McALISTER. The point was raised yesterday at the Committee, and the answer was this. The registration of the Dental Practitioner is by the Act confined to the Office in London, because the General Registrar has to carry it out. It is by the registration of Dental Practitioners and the fees paid that the Dental Funds alone are provided. There are no fees for the registration of Dental Students, and therefore to throw the work upon local officers would be throwing work upon them for which we should have no return to the Dental Fund. I think that is the kind of reason which has made the rule what it is.

Dr. BATTY TUKE : I move the adoption of the report which has now been received.

Dr. McALISTER seconded the motion which was agreed to.

June 3rd.

John Eustace Dennan, registered as in practice before July 22nd, 1878, was summoned to attend before the Council to answer the following charge, namely :—“That he was convicted at the Central Criminal Court on January 7th, 1895, of obtaining money by false pretences, and sentenced to ten years penal servitude.”

Mr. Muir Mackenzie attended as Legal Assessor.

Mr. John Eustace Dennon was not present.

The Registrar said the following Report had been sent in from the Dental Committee on the facts in regard to the case of John Eustace Dennon:

REPORT ON THE CASE OF JOHN EUSTACE DENNON.

The case of John Eustace Dennon having been referred to them by the Executive Committee to ascertain the facts in regard to such case, the Dental Committee find the facts to be as follows:—

(1) That John Eustace Dennon was registered in the *Dentists' Register* on July 31, 1879, as having been in practice before July 22, 1878, and with the address 49, Talbot Road, Bayswater, London, W.

(2) That John Eustace Dennon was at the Central Criminal Court on January 7th, 1895, convicted of unlawfully obtaining money by false pretences and sentenced to ten years' penal servitude as appears by the certificate of his conviction now put in.

(3) The Committee recommend the Council to remove the name of John Eustace Dennon from the *Dentists' Register*.

CERTIFICATE OF CONVICTION.

Central Criminal Court (to wit).

These are to certify that at the General Session of the Delivery of the Queen's Gaol of Newgate and other prisons, holden for the Jurisdiction of the Central Criminal Court at Justice Hall, in the Old Bailey, in the suburbs of the City of London, on Monday, the 7th day of January, in the year of our Lord 1895, before certain Justices of our said Lady the Queen, assigned to deliver the said Gaols of the prisoners therein, being John Eustace Dennon, otherwise known as John Eustace, was in due form of Law convicted on a certain Indictment against him for unlawfully obtaining by false pretences from Maud Easterbrook the sum of two shillings and sixpence, and from Maud Annie Wood the sum of five shillings, in each case with intent to defraud against the Statute, &c., and against the peace, &c., and the said John Eustace Dennon, otherwise known as John Eustace, was thereupon ordered to be kept in penal servitude ten years.

Dated the 21st day of January, 1895.

H. K. AVORY,
Clerk of the said Court.

Mr. WHEELHOUSE moved "That the name of John Eustace Denham be removed from the Register."

Mr. BRYANT seconded the motion.

Dr. GLOVER: Before that is put I should like to ask Mr. Muir Mackenzie if he could give us any particulars of the case. I see he is charged with having defrauded persons of 7s 6d. Do you know if there is anything in this man's previous history?

Mr. MUIR MACKENZIE: The only official knowledge that the Council has is the certificate of conviction on which the Council usually acts under the Statute. Mr. Dennan himself has written a very long memorial complaining that his trial was an unfair one. As the trial, however, was before a Judge of the High Court and a Jury, and he was convicted and sentenced to ten years penal servitude, I apprehend, though I have not read through the proceedings, that the small sum of money was simply taken as one indictment. It is usual to indict upon one charge which may represent many others. When a man has embezzled several sums of money we indict him for one only.

Strangers having withdrawn, the Council deliberated on the case, and on the readmission of strangers, the President stated that the Council had resolved to direct the Registrar to erase the name of John Eustace Dennan from the Dentists' Register.

DENTAL BOARD OF VICTORIA.

The ordinary meeting of the Board was held on Friday evening, the 22nd February, 1895, at eight o'clock, the President (Dr. Turner) in the chair. Also present Drs. Cresswell and Springthorpe, and Messrs. F. A. Baker, J. George, J.P., J. Iliffe, F. A. Kernot and E. L. Oldfield.

The minutes of the previous meeting were duly read and confirmed.

A deputation representing the Dental Students of Ballarat waited on the Board to urge that immediate steps be taken to have the necessary lectures delivered under the dental curriculum. A number of students were, the deputation represented, now ready to attend lectures. Dr. Hardy, of Ballarat introduced the deputation, and acted as its chief spokesman.

The Board resolved to take the necessary action at once for the appointment of the lecturers required, and a committee consisting of Drs. Cresswell and Springthorpe and Mr. F. A.

Kernot were appointed to take immediate steps for their appointment.

The deputation thanked the Board and withdrew.

REGISTRATION OF A DENTIST.

Robert Davidson Brooke applied to be registered as a dentist under section 55 of the Act. He appeared in person, and Dr. Mullen also appeared on his behalf. Mr. George moved registration, Mr. Baker seconded. Carried.

The annual report was considered and approved.

Correspondence was dealt with and the Board adjourned.

DENTAL BOARD OF VICTORIA.

The ordinary meeting was held on Friday evening, 23rd March, 1895, at 8 p.m., the President (Dr. Turner) in the chair.

The Dental Curriculum.

A deputation of dental students, accompanied by Mr. E. E. Haworth, dentist, of Melbourne, waited on the Board and urged that the dental curriculum should be made simpler. The deputation stated their case and withdrew.

The Dental College of Victoria.

A deputation was received from the Dental Association of Victoria, requesting that the Board's recognition might be given to the Dental College and Hospital of Victoria, established by the Dental Association. Dr. Springthorpe gave notice that he would move at the next meeting of the Board that such recognition be accorded.

Appointment of Hon. Treasurer

Mr. F. A. Kernot was unanimously re-appointed the hon. treasurer of the Board.

Notice of Motion.

At the meeting of the Board, held on the 22nd February, Mr. Oldfield gave the following notice of motion:—In view of the general dissatisfaction with the course of study prescribed by this Board, that the Dental Board of Victoria shall revise and amend the regulations regarding students, and that the Board shall then consider and adopt a curriculum more in accord with Australian requirements, which shall embrace the salient points of the best schools of dentistry, and that, pending the adoption of such curriculum, the Board suspends such portions of the regulations as may be necessary to allow students to take the Modified Examination during the years 1895-96. Consideration was postponed for a special meeting of the Board, to be held on Monday evening, the 1st April, 1895. The Board adjourned.

SPECIAL MEETING.

Held Monday evening, 1st April, 1895, at 8 p.m. The President (Dr. Turner) occupied the chair; also present: Drs. Gresswell and Springthorpe, and Messrs. F. Baker, J. George, J.P., J. Iliffe, F. A. Kernot, and E. L. Oldfield.

A letter was received from the Chief Secretary, advising that certain dental students had submitted a complaint that the present dental curriculum was both too severe and impracticable, and requesting the opinion of the Board on the matter. Dr. Springthorpe moved that the president and registrar be a committee to draw up a reply. Mr. Iliffe seconded the motion, which was carried.

Mr. Oldfield submitted his motion, which Mr. Baker seconded. Discussion ensued.

On the suggestion of Dr. Gresswell, Mr. Oldfield withdrew his motion for the present with a view to his submitting new and specific regulations in lieu of the present ones.

SPECIAL MEETING.

Held the 9th April, 1895, at 8 p.m. The president (Dr. Turner) in the chair.

Dental students having forwarded an intimation to the Board that they had no present intention of attending lectures, Dr. Gresswell moved—"That the gentlemen who had applied for the various lectureships be advised that the students had withdrawn, and therefore the Board would not at present appoint lecturers." Mr. Kernot seconded the motion, which was carried unanimously.

It was decided, on the motion of Dr. Gresswell, seconded by Mr. Baker, to advise the Chief Secretary that it was recognised by the Board that the wording of the Dental Regulations, as far as relates to the Curriculum, is somewhat in excess of what is actually required, and that the Board contemplate amending the regulations so as to bring them into closer harmony with what is actually required.

The Board adjourned.

VACANCIES.

The Dental Hospital of London, Leicester Square, W.C. There are two vacancies for Assistant Dental Surgeons. Applications to be made to the Secretary by July 8th.

National Dental Hospital, Great Poland St., W. The posts of Assistant Dental Surgeon, and of Lecturer on Dental Anatomy are vacant. Applications to be made to the Secretary before July 4th.

National Dental Hospital, Great Portland Street, W.—
 Vacancies for two House Surgeons. Applications to be made
 before July 4th, to the Secretary.

Dental Hospital Reports.

WORK DONE at the Victoria Dental Hospital of Manchester,
 during the month of May, 1895.

Number of Patients attended	1206
Number of Extractions	629
Number of Extractions under Anæsthetics	182
Gold Stoppings	49
Other Stoppings	71
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	305
Crowns	9
Irregularities	17
Inlays	1
Total	1263

J. BUTTERWORTH, *House Dental Surgeon.*

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
6. The Journal will be supplied direct from the office on PREPAYMENT of subscription as under:

Twelve Months (post free) - - - 14s. 6d.

Post-office Orders to be made payable at the Langham Place Hotel Office, to G. E. Skliros, 289 & 291, Regent Street, W. A single number sent on receipt of seven (penny) stamps.

British Journal of Dental Science.

No. 659. LONDON, JULY 1, 1895. VOL. XXXVIII.

THE NATURE OF THE TRANSPARENT ZONE OF DENTAL CARIES.*

By F. J. BENNETT, M.R.C.S., L.D.S.

Mr. President and Gentlemen,—Amongst the phenomena of dental caries there are none of greater interest, none upon which opinions still differ more, than those relating to the zone of transparency. A true knowledge of the nature of this appearance is desirable, not only in relation to dental caries, but also as throwing light on the properties of dentine itself. For, should the zone of transparency prove to be a manifestation of a physiological activity of the living parts of dentine, that structure would be brought into much closer affinity with the other tissues of the body than would be possible to ascribe to it otherwise.

The evidence which I place before you this evening may be considered as the outcome of an enquiry, on my part, as to how far the zone of transparency favours the view of vital activity in response to the stimulus of caries, or the reverse. Dentine in this condition has formed the subject of so many able and well-known enquiries on the part of others that I can do no more than summarise the results. The opinions generally resolve themselves into the question : Is the transparency due to increased calcification of the part or not ?

* Read before the Odontological Society of Great Britain.

There can be no doubt that this point clearly proved would go far to settle the matter.

The older view, that it is an area of increased density, due to consolidation of the fibril, is advocated by Sir John Tomes, Dr. Magitot, Dr. Miller, and others ; whilst the later view, supported by Messrs. Leber and Rottenstein, Professor Wedl, Dr. Black and Dr. Abbott, regards the area as one of partial decalcification and disintegration. Mr. C. Tomes, perhaps, inclines to the latter class of opinion. Moreover, some of these observers regard the zone of transparency as identical with the horny translucency in the old roots of teeth.

The most damaging argument against those who hold the view of increased calcification of the fibril, is that which asserts that a transparent zone is to be found in natural teeth mounted on plates, and which have subsequently been attacked by caries. For it would be difficult to understand how a fibril could become calcified when once the tooth was dead. However, the presence of the transparent zone in relation to caries, in such teeth, appears to be doubted by Dr. Miller. But although he speaks of having "split about about sixty, which appeared especially suited for the purpose, one case only revealed a phenomenon resembling transparency, but even in this case it was not possible to say the change was not brought about whilst the tooth was still living." It must be remarked, however, that Dr. Miller does not mention having examined the specimens under the microscope. Dr. Miller, returning to the general question of the zone of transparency, says: "A decalcification, however, has most certainly not taken place in the transparency in question."*

The matter being left an open question, I determined to examine specimens stained with gold chloride, and further to select, amongst others, teeth in which there was a partial or

* "Micro-organisms of the Human Mouth," p. 161, 1890 edition.

complete arrest of the caries, as in these the fibril might be supposed to be calcified from the fact of the arrest.

With two obvious exceptions the teeth were all fresh, with living pulps. No acid whatever was used in any part of the process. They were ground, polished, soaked in the gold chloride solution, and finally mounted in glycerine jelly. The dentinal fibrils and the carious portions are the parts deeply stained.

I will now have the specimens shown on the screen and describe the appearances of each.

No. 1 shows the general relation of the parts in a specimen in which partial arrest of caries has taken place. Below, the margin of the pulp cavity is seen with traces of the cornua. The normal dentine is seen above, then a well-marked zone of transparency, roughly following the contour of the pulp cavity; finally, the darkly stained area of partially arrested decay. It will be seen that this surface is flat above; no doubt in an earlier stage it may have been less regular, but the wear of mastication has reduced it to a common level. The surface had become polished and fairly hard, and nature had all but effected a cure, save where the rough edges of enamel remained and formed lodgment for food. The section being cut quite perpendicular to the carious surface, the zone of transparency is nearly uniform in thickness throughout. Sometimes a misleading appearance is produced as to the thickness of the zone, where various surfaces of the tooth are attacked by caries at the same time, then the various areas of translucency mingle and become irregular patches.

In relation to a subsequent specimen I will here point out that if in a tooth similarly affected a transverse section be made on a level with the transparent zone, the slice would cut through a core of normal dentine surrounded by a ring of transparency, the remainder being the hardened arrested

caries ; secondary dentine might also appear in the centre of the core.

No. 2 is somewhat similar, but here the decayed surface has been worn away at the prominent crest, exposing the normal dentine, whilst in the valleys, caries is still present. The transparent zone crops out at the foot of the crest.

No. 3 is a higher magnification of the same specimen. The transparent area is seen, the normal tubes rather suddenly become indistinct on entering the zone, while the dark axial line of the fibril almost entirely disappears. The tubes lie as in a glassy matrix. Here and there the axial portion of the tubes is beaded. These appearances are seen under the microscope and require a higher magnification.

No. 5 shows a transverse section of partially arrested caries at about the level described in the first specimen. The four islands of secondary dentine are surrounded by areas of primary dentine, with rings of transparency. The rest is arrested caries, with active caries, the latter forming a dark margin on one side. The section is thin, and cut through in places.

In one or two specimens, I fancied there was evidence of the dentinal tubes being enlarged in places within the zone of transparency, and concluded that the only sure way of settling this point was to make the section in such a way as would cut the tubes across, as nearly as possible at a right angle ; in this way the exact relative size of fibril, tube, and matrix could be measured in the various areas. The present specimen was made for this purpose.

No. 5. Under this magnification, and from a part of the ring of transparency, this specimen is seen. The tubes are clearly seen to be thickened and enlarged, and present the pipe-stem appearance. It is the thickening of the tube or sheath which is the important point. This specimen perhaps includes some normal tubes. It is quite impossible

to see in such appearances as these the slightest suggestion of an increased calcification of the fibril, in fact all point to an opposite conclusion—a close resemblance to the pipe-stem appearance of incipient caries. These appearances are found in more than one part of the transparent zone, and are for your inspection under the microscope.

No. 6 is a less magnified view of the same, showing the transparent area from which such appearances as the last are seen.

No. 7.—A specimen of partial arrest, the zone clearly showing, and a central spot from which the next photograph is taken.

No. 8.—This again shows the tubes thickened very clearly in the translucent zone. It is well seen under the microscope.

No. 9.—The next specimen represents a longitudinal section of a natural tooth mounted on a plate and subsequently attacked by caries. The concave margin is the part next the plate, and is the situation usually affected with caries. The transparent zone is, I think, clearly marked, and unites at the sides with the horny peripheral layer not uncommonly seen in old dead teeth. Beading and varicosity can also be seen under the microscope.

No. 10.—Following my plan of examining the tubes when cut transversely, I selected an upper central incisor, which had been mounted on a plate and afterwards affected with caries, in a similar situation to the last, making a section parallel to the front or labial surface. The lower margin of the photo represents the cervical region with the caries spreading upwards. The zone of transparency is best seen in the lower left corner, and here the tubes are cut at a right angle and are seen in the next photo.

No. 11.—The transparent zone occupies the whole of the upper part; below is the carious portion. In about the

middle of the specimen the tubes are cut directly across, and I fancy show a distinct thickening. However, the specimen is under the microscope for you to form your own opinion.

To summarise these results, I would say that inasmuch as enlarged and thickened tubes can be demonstrated in parts, I do not say in every part and in all cases, we cannot regard the zone of transparency as an area of increased calcification and that the phenomena point to the zone as representing a precursory stage of dental caries.

THE IMMEDIATE ADVANCEMENT OF PERMANENT TEETH.

By SIDNEY SPOKES, M.R.C.S., L.D.S., Eng.

Even if it be not true that with increasing civilization irregularity in position of the teeth becomes more marked, yet the present proportion of such cases in dental practice is of sufficient importance to lead one to watch closely for any improvements in treatment.

The orthodox time for dealing with cases of irregularity is, of course, during childhood and puberty, according to the condition presenting, and most practitioners are not very hopeful of accomplishing much when the patient who comes for advice is over twenty-one years of age. The full completion of the roots of the teeth and probably the increasing density of the alveolar processes render such cases more intractable, added to which the ordinary methods of treatment may require the keeping in place of some mechanical apparatus, the inconvenience of which need only be hinted at.

The timely discovery of an irregular arrangement of permanent teeth can only be made by the dentist when the patient has the mouth periodically inspected, and we have here one of the strongest arguments in favour of such a system. It must always be remembered that it is not alone from an esthetic aspect, but also from the functional point of view that such deformities should be prevented. A crowded denture is no doubt unsightly, but it also predisposes to Caries with possible loss of teeth. Again, interlocking of upper incisors and mal-occlusion of cusps may so seriously prevent proper mastication as to suggest that certain teeth are as good as lost.

Those who wish to acquaint themselves with what may be done in the case of adults, will study with interest the papers by Dr. Cunningham, of Cambridge, and Dr. Bryan, of Basle. The treatment may be considered heroic, like the implantation of teeth in newly-formed sockets, but it is not now the writer's intention to deal with such cases, or to criticise the treatment recommended.

It is proposed to record a series of instances in which certain upper teeth in the front of the mouth had so far erupted within the arch as to be bitten over by the lower teeth when articulation was complete. They are, further, all cases in which the faulty position was caused by the undue retention of the temporary teeth and in which these latter were still persisting at the time of treatment. If a child comes under observation at a fortunate moment, *i.e.*, when the permanent tooth is only just showing through the gum, the removal of the persistent temporary tooth is all that is necessary, for, provided there is room in the arch, the tongue may be relied upon to ensure the permanent tooth taking its proper place. But when inspection of the mouth is made at a less favourable period, and it is discovered that the cutting edge of an upper permanent tooth passes behind (or, more accurately, is bitten

over by) the cutting edge of a corresponding lower tooth, some other treatment than the mere extraction of the temporary tooth becomes necessary. Such a condition is not uncommon. One, or more, of the incisors is generally the victim of a persistent temporary tooth, the proportion of canines erupting inside being very much less. Of course if no treatment is undertaken, the temporary tooth is finally shed and the misplaced successor remains permanently locked within the bite ; a facet forms on the anterior surface, the corresponding tooth, or teeth, in the lower jaw may be pushed somewhat forward (partial "underhung bite"), and the lateral movement of the cheek-teeth is seriously hampered. Perhaps one of the most unsightly modifications is seen when a lower canine closes over a depressed upper lateral. Such irregularities certainly demand treatment and the whole class is included amongst the forms of misplacement in which immediate interference is justifiable. The erupting tooth, with its widely open apex, only needs to have its cutting edge advanced over that of its opponent, and active treatment is at an end ; it may be left to gradually assume its natural position, and there is manifestly no need for any retention apparatus. In order to bring about this result it has generally been considered necessary to insert a plate which will raise the bite sufficiently to allow the cutting edge of the errant tooth to pass over that of its opponent, and which also provides a *point d'appui* for a peg or wedge of wood to be applied to the lingual aspect of the tooth. Or the plate may be adapted to the lower jaw in certain cases ; most of us have seen the rapidity with which an inclined plane placed upon the lower teeth will bring the upper tooth outside. Or temporary crowns may be placed on molar teeth. Some practitioners maintain that it is unnecessary to raise the bite, the supposition being that when the loosened tooth arrives at the "sticking-point" the patient will bite it over.

Although the writer has successfully moved such teeth more or less gradually with elastic bands, ligatures, etc., and without raising the bite, he is prepared to find that certain cases require the latter provision to be made. If, however, all such apparatus can be avoided in a child's mouth and the regulation brought to a speedy termination, it is evidently of advantage to both patient and operator. The following cases are therefore offered as a contribution to the subject. Lantern slides of the models of all except the last were shown at a recent meeting of the Odontological Society.

CASES.

CASE I.—Rose T., aged 8 years. This patient was first under observation in October, 1892, when two lower first temporary molars needed extraction. In July, 1893, the left upper permanent lateral was found to be erupting inside the arch, in consequence of the temporary tooth being retained. This latter was extracted and also the right lower second temporary molar. In February, 1894, the upper lateral was found to be in line but it was noted there were no signs of the corresponding tooth on the right side. Seven months later, however, the right upper lateral was found to have so far erupted, and within the arch, as to be bitten over by the lower teeth. The persisting temporary tooth was extracted and under Nitrous Oxide the permanent lateral was forcibly moved forwards to clear the bite, and supported with a piece of silver wire. This was the first experience of the writer in such a method. Considerable force was necessary, and as an ordinary pair of stump forceps, with unguarded blades, was used, the enamel on the cutting edge of the advanced tooth was slightly chipped. A week later, the tooth was found to be quite comfortable. A fortnight after this the tooth was noted as being quite comfortable. It was tested with heat on June 8th, 1895,

and responded in a normal manner. The edge has been smoothed and polished.

CASE 2.—Elizabeth C., aged 17 years. This case was first seen shortly after the tooth in the last case had been successfully moved. Both permanent canines were within the arch, which was V-shaped, and the temporary canines and laterals were persisting. Instead of extracting the permanent canines it was determined to try and get them into their proper places as this would have much improved the arch. Under Nitrous Oxide the right upper temporary canine was extracted, and an attempt made to move the permanent one into its place. It resisted all efforts and finally slipped up the blades of the forceps from the socket. It was at once replaced and after an interval during which it was quite comfortable, the other temporary canine was removed and a split vulcanite plate, to raise the bite and push the permanent canines outwards, was inserted. After some improvement the patient ceased attendance at the hospital. She was in service and her mistress objected to the interference with her speech. She has probably had the canines extracted and the case must certainly be regarded as a failure.

CASE 3.—Clara R., aged 11 years. First seen in February 1895. The left lower canine was erupting inside, and the right one had the tip showing in a similar position. The right upper lateral was within the bite, its temporary predecessor persisting. The two lower temporary canines, left lower first temporary molar and right lower second temporary molar were removed. The following week, March 2nd, the right upper temporary lateral, with a long root, was extracted and the permanent tooth forcibly advanced into its place and supported with silver wire. On March 9th the tooth was found to be comfortable, and responded to the thermal test on June 8th.

CASE 4, Elizabeth S. aged 8 years. On March 2nd, 1895,

when first seen, it was found that the two upper centrals were bitten over by the lower teeth and that the temporary teeth were *in situ*. The following week under N_2O the temporary teeth were extracted and both permanent ones brought^t forward over the lower teeth. Silver wire was passed behind the centrals and over the temporary laterals. The following day a curved piece of wire was attached to the temporary canines and the centrals fastened to it. They were quite comfortable, well over the lowers, and perhaps did not need any attention. They responded to the thermal test on June 8th.

CASE 5.—William D., aged 14 years. On March 9th, 1895, the left upper canine was found erupted inside. Its temporary predecessor was removed and an attempt made to bring the permanent tooth into place. It resisted all efforts and the tip was finally chipped. On June 8th it was found outside and responded to the thermal test. This case, then, was a failure so far as “immediate regulation” is concerned.

CASE 6.—Thomas K., aged 10 years. On March 16th, 1895, the two lower laterals and the left upper lateral were found to be erupting inside. The lower temporary laterals were removed, and the following week the upper temporary lateral was also extracted and an attempt made to bring the permanent lateral outside the bite. The lower left temporary canine was, however, too prominent and could not be cleared. On June 8th it was well outside, biting over the temporary canine, and responded to warm Gutta Percha.

CASE 7.—Henry D., aged 10 years. On March 16th, 1895, the left upper lateral was found to be inside with the temporary tooth retained. The following week the latter was removed and the former forcibly advanced into place. A silver wire round the root of the temporary canine was passed behind the lateral and over the central. The tooth was still slightly loose on April 6th, but there was no pain. On April 27th the right upper temporary lateral was removed. There

was an absorption groove on the lingual aspect of the root as if the permanent tooth might be coming down on the inside. The left lateral did very well and responded to the thermal test on June 8th.

CASE 8. Sophia B, aged 8 years. First seen in 1893. On April 4, 1895, both upper laterals were found to be bitten over and the upper temporary canines also blocked the way. The temporary teeth were removed, the laterals forcibly advanced, and a wire passed behind them and over the centrals. They both responded to the thermal test on June 8th.

CASE 9.—Albert P., aged 14 years. First seen on May 21st. Both temporary canines present. On the left side the permanent canine was next the central, and the lateral was fully erupted inside. The right permanent canine was erupted inside the bite, and was also blocked in by the misplaced root of the first temporary molar (bicuspid erupted). Under N_2O the right temporary canine and the molar root were removed and an attempt made to forcibly advance the permanent canine. A second attempt was also unsuccessful and the tip was chipped. The following day, again under N_2O , it was easily moved outside the bite and a partial Hammond splint, previously prepared was adjusted from behind the bicuspids. On the 24th the tooth failed to respond to heat, and there was some tenderness on pressure being made over the root. On the 28th, the tooth was quite comfortable without any tenderness. The left upper lateral was extracted. On the 31st he reported himself but $\frac{1}{2}$ was not seen, and has not been to the Hospital again.

CASE 10.—Nellie H., aged 7 years. First seen on June 1st. The temporary centrals were retained. The permanent centrals were bitten over by the lowers, and behind them were the lower laterals. The cutting edges were directed slightly backwards and there was a large fleshy papilla of gum in front of their approximal margins. An impression

was taken and a Hammond splint prepared extending behind the first temporary molars. The following day a division was made with a file, between the temporary molars on each side to admit the wire, and the upper temporary incisors were removed. Under N_2O the permanent centrals were forcibly advanced, so that their cutting edges overlapped those of the lower centrals and the splint was applied. The next day the lower temporary laterals were removed and the gums painted with Tinct. Iodi. The upper centrals were quite comfortable, and when the splint was removed five days later, both responded to the thermal test.

CASE II.—Edwin S—, aged 7 years. First seen on June 15th. The right upper central was much bitten over. The temporary tooth was extracted, the permanent one forcibly advanced and supported with silver wire. When seen the following day the tooth was comfortably in place, but the patient had removed the wire.

Of course the method of treatment adopted in the above cases is open to criticism, but perhaps a few words as to the general results may not be considered out of place. Five centrals and six laterals were found misplaced ; they were all safely moved. The only mishap was a slight chipping of the enamel edge in the first case, and this is not now apparent on looking into the patient's mouth. It is perhaps with regard to the three canine cases that objection may be taken. One was an instance where other methods of treatment might be considered more appropriate. The tooth was unintentionally extracted, but was replaced and lived, although this may be a doubtful blessing. In the second case the tip was broken but the tooth is now in place and alive ; the fracture was probably just sufficient to allow it to pass the bite, gradually pushed forward in the usual manner. In the third case the tooth is over the bite, it has a slightly chipped cusp, but one is in doubt as to the continuity of the nerve supply.

Leaving the canines out of the question it is claimed that so far as incisors are concerned the operation by "immediate forcible advancement" is justifiable. It differs from the operation known as "torsion," and, provided some means might be taken to overcome the resistance of the anterior wall of the socket, could be successfully performed even when the temporary teeth were not found persisting.

In these cases there was, so to speak, some sort of place close by to which the permanent tooth could be moved, after the temporary tooth was extracted. And yet in spite of the absence of the resistance of a fully completed socket, it was a matter of surprise to find the amount of force necessary to be employed. This was especially so in the case of the canines. The forceps employed was that with which upper temporary molars are usually extracted. A piece of rubber tubing can be slipped over the blades, or at all events on the lingual one, but it seems best to leave the edges free so as to secure some penetration and to grasp the tooth firmly. Chipping the enamel edge is to be avoided by moving the tooth bodily forward with steady pressure sufficiently prolonged, taking care to resist the temptation of using leverage with the lingual blade against the cutting margin. The alveolus is finally felt to "give." The other possible accident is, of course, the loss of the tooth by unintentional extraction, or by injury to the pulp. But at such an early stage of development as obtained in the cases of incisors mentioned above, the root is unformed, and there is no twisting of vessels as might perhaps occur in extreme cases of "torsion." In the event of the tooth slipping up the forceps from its socket, it would be well to at once place it in the position required, and, supported with a wire splint, restoration of the circulation may be hoped for, even if we must not expect nerve fibrils to re-unite. When the tooth is once over the lower bite there is not much chance of its getting back again,

but interlacing a fine silver wire steadies the tooth and probably adds to the patient's comfort. All the patients mentioned above stated there was no pain after the actual operation.

ANCIENT DENTISTRY.*

By Mr. H. W. MOORE.

Mr. President and Gentlemen,—There were many arts known to, and extensively practised by the Ancients and among them was the subject of my paper, namely, "Dentistry."

To the older members of the profession who have watched carefully the progress and very nearly the commencement of modern dentistry,—for its present state of perfection dates from within the last fifty to sixty years—it will appear strange that it is but the awakening of an art, which, for the space of over seventeen hundred years had been blotted out of the numerous industries peculiar to the civilized world. It is very probable that Tully, Virgil, Horace and Macænas, as well as the Triumvirate Cæsars, availed themselves of the services of Cascellius, a Roman dentist, who filled and extracted teeth.

Modern civilization seemed to show no thirst for information in this art until the last century, when Hunter and Bichat turned their attention to diseases of the teeth. The progress made in Dentistry was very slow until well on in the present century, when it apparently advanced by leaps and bounds, by the same mental stimulus that hastened steam to

* Read before the Students' Society, National Dental Hospital.

machinery, and thought to electricity. Dentistry was thus elevated to the height it was nearly five hundred years before Christ, when it was customary to fill the teeth with gold, and to use wire of this metal to bind them together, when loosened by age or injury. It is manifest that the ancients must have had a good deal of skill and a very fair knowledge of Metallurgy, to enable them to prepare gold for this work.

In the natural order of progression those things which are necessary for physical existence would be developed first, and then those necessary for comfort, and lastly, those required to gratify the taste, to adorn the person, and to attract admiration.

It is reasonable to expect that the development of the art of Dentistry, according to this law, would be very slow, and at what period it did actually begin I have been quite unable to find out. The earliest reference, by any authority which I have found, (and curiously enough, it was not mentioned then as a new art, but because the sanctity of the grave appealed to the merciful protection of the law against violence to the teeth of the dead, which were filled or bound with gold, for the wicked were tempted then as they are now with the precious metal), is a fragment of the tenth of the twelve Roman tables which were adopted by the Senate, the Centuries, and the Curiae, B.C. 453, which relates to the burial of the dead, and provides against the removal of gold from the teeth in the following language :—

“(Mortuo) neve aurum addito cui auro dentes vincti essunt ast eum cum illo sepelire urere sine fraude esto.”

“Let no gold be placed upon the dead, but, where the teeth are bound with gold, it is to be buried or burned with the body without injury.”

It was the custom of the Romans to remove all gold ornaments from the dead before burial, made so by the above law.

Herodotus, who wrote 450 years before Christ, says that among the Egyptians there were skilful physicians fifteen hundred years before that time, and that they were required by law to confine themselves to a single branch of the art, and that diseases of the teeth was one of those practised upon. It is reasonable to infer that they extracted and repaired the teeth, and even filled them when decayed with some indestructible substance, because they were far more learned than other nations, and greatly advanced in the various arts and sciences.

Whatever knowledge they had transferred to Greece, and thence to Rome, through the three commissioners sent beyond the sea into Greece, to collect such notices of the laws and constitutions of the Grecian States, as might be serviceable to the Romans in the reorganization of their own laws, the Decemvirs availed themselves of this information in framing the twelve tables which continued for hundreds of years to be the foundation of the Roman laws. A Sophist, of Ionia, is said to have rendered valuable assistance to the commissioners in explaining to them the arts, laws, and institutions of his countrymen, and especially of the Athenians, the great glory of the Ionian race.

The fragment of the twelve tables, relating to the burial of the dead, offers abundant evidence of the existence and perfection of the art of dentistry at the time of their adoption. It specified the binding together of the teeth with gold, and then provided that such gold should be buried or burned with the dead body, and that no violence should be offered by attempting to remove it. It was a provision against the violation of the dead for the sake of the gold used by the dentist for the preservation of the teeth. But added to this, there is other testimony relating to this subject, from those who are recognised throughout the civilized world as standard authorities upon matters on which they write.

Four hundred years before Christ, Hippocrates spoke of joining the teeth together with gold wire, and recommended it in fractures of the jaw bone, or where the teeth were loosened by injury or disease:—

“Dentes inter se conjungere oportet—atque hoc maxime auro.”

It is proper to join the teeth together, and this should especially be done with gold.

Before that time, seven teeth were found in a Greek tomb united together with gold wire.

Celsus, a distinguished Roman physician, who wrote in the first century, recommended that the decayed part of the teeth should be scraped or filed off.

“Dens autem scabro qua parte niger est, radendus est.”

The hollow part of the tooth was also cleaned and scraped.

We are informed by the Roman poet, Martial, that the ladies of Rome increased their personal attractions with artificial teeth made of bone or ivory.

“Sic dentata sibi videtur Ægle,
Emptis ossibus, Indicoque cornu.”

Mar. Lib. 1 Ep. 72.

So Ægle, with her bought and Indian bone,
May seem to have a second mouth of her own.

The same author in his tenth book of epigrams, says:—

“Eximit aut reficit dentem Cascellius ægrum.”

“Cascellius extracts or repairs the aching tooth.”

Here we have the Roman dentist Cascellius who “eximit” (extracts), if necessary, or reficit (repairs) the diseased tooth, just as is done at the present time. The same author, in an epigram addressed to tooth powder says:—

“Quid mecum est tibi? me puella sumat: Emptos non soleo polire dentes.”

“What have I to do with you? Let the fair and young use me. I am not accustomed to polish false teeth,”—literally

bought teeth, and again this author mentions teeth which were bought.

“Thais habet nigros niveos Lecania dentes quae est ratio? Emptos haec habet. Illa Suos: Dentibus atque comis nec te pudet uteris emptis.”

Thais has black and Lecania snowy white teeth, because the former has her own, the latter false teeth, and does not blush to wear false teeth and hair.

Lucian, of Samosata, who wrote in the second century, in his satire upon the complete orator, says:—“After this I made up to a rich old dame, who, in spite of her seventy years, had still a great liking for handsome young people, pretended a violent passion for her, notwithstanding the fact that she had only four teeth, and they were fastened in with gold wire.”—*Took's translation of Lucian*, vol. II. p. 511.

I have thus presented the evidence which I have gathered of the existence of dentistry, dating authoritatively 453 years before Christ, and extending to the end of the first century of the Christian era, a period of nearly 553 years. How long before, and how long subsequent to those periods, it existed, I have no means of ascertaining. Its beginning and end could not have been abrupt, for it is an art, necessarily of slow growth, and was probably extinguished only when barbarism crushed out the arts and sciences of Greece and Rome.

I have proved by the twelve tables that dentistry had a legal recognition 440 years before Christ. I have also proved that Hippocrates recommended the use of gold wire, in binding together loose teeth 400 years before Christ, and that the Roman physician, Celsus practised the art in the first century. I have shown that it was an art familiar to the great writers of Rome, and that they made frequent intelligent allusions to it, and that the ladies preserved their charms with purchased teeth made from ivory and bone.

It was then as now, an expensive luxury, and the word "bought" implied that it was artificial, and that the dentist required pay for his material and skilled labour. I have proved by Martial that the dentist Cascellius extracted and repaired teeth, and by the same author that tooth-powder disdained to be applied to false teeth. I have proved by Lucian that an old woman of his time had but four teeth, and that they were held in by gold wire.

This proof extends over a period of nearly 600 years, and is conclusive, as well as additional evidence of the advanced civilization of a people whose arms had subjugated and whose laws governed from the Baltic to the Nile, and from the Atlantic west to the Euphrates, a Government which Dionysius, of Halicarnassus declared to be the Mistress of every country not inaccessible or uninhabited; that every sea owned her power, not only that within Hercules' pillars, but also the whole navigable ocean; that she was the first and only State recorded in history that ever made the East and West boundaries of her empire, and whose Senate was worthy the appellation of an assembly of kings.

It was natural enough that an aggressive people like the Romans, who never gave back or away a single foot of territory acquired in peace or war, who had all the learning of the Egyptians and the Grecians, skilled in oratory, poetry, the sciences and useful arts, should have a practical knowledge of dentistry, as they had of heating their houses by means of hollow tubes, curiously laid in the walls through which the heat was transmitted simultaneously to every part, from the lowest to the highest equally: or of that art, shorthand writing, in which they were especially skilled. From Seneca Book XC. I find the following:

"Quid verborum notas quibus quamvis citata excipitur oratio et celeritatem lingue manus sequitur."

Swift though the words, the pen still swifter sped,
The hand was finished ere the tongue has said.

THE RELATION OF CARIOUS TEETH TO ENLARGED LYMPHATIC GLANDS,

As shown from an Examination of School Children.

By RICHARD HOPPE, Dentist, Leipsic.

Both in private practice and outside, I have often been struck with the frequent occurrence of enlarged glands in connection with the jaws of children. Such observations combined with one's experience show that no disease in early life is so frequent and so widespread as decay of the teeth. I thought also that one might recognise a not infrequent relation of both diseases to one another, and took an opportunity to speak to a school director of this place upon these conditions. He was much interested in the subject, and readily acceded to a request that I might make an examination of his school. This opportunity was useful in order to undertake two different, and yet connected, investigations. One had for its object the identification of the tubercle bacillus in carious teeth and in the secretion of the oral cavity, and the other the conditions existing between carious teeth and enlarged lymphatic glands. Ever since bacteriological science enlightened us as to many hitherto unknown processes of disease, practical medicine has endeavoured to turn to account this results of this knowledge. But whilst one met all other hygienic demands, the oral cavity, an important point of attack, has been overlooked more or less. Although just here all the conditions for the colonization and increase of micro-organisms are to be found, yet this point has not been accorded the common consideration which it deserves. It explains the frequency of cases of disease which are often very difficult and fatal. I therefore considered it worth while to commence researches as to carious teeth infecting the

lymphatic glands of the jaw. In connection with the work as to the occurrence of tubercle bacilli in the mouth, I started from the following fundamental theory, for scrofula and tuberculosis the same origin of disease, the tubercle bacillus, scrofulous lymphatic glands of the jaw caused by the immigration of these bacteria in carious teeth by way of the lymphatic canals. There is often no explanation for the infection of the lymphatic glands by these microbes; the nearest anatomical path is that suggested. The immigration at least occurs partly in this way. Moreover, wounds and different diseases of the surrounding soft parts can open a passage in the lymphatic canal.

As already mentioned, even in infancy scrofula of the lymphatic glands, whether acute or chronic, is one of the most wide-spread of diseases, and is often very prejudicial to the normal life-conditions of the child, besides the dangers which are commonly agreed upon. Along with this indifferent health there is naturally a certain weakness and disposition to other diseases. Nutrition suffers much. Capacity and desire to work, attentiveness, are inadequate. How very much the school is injured by these conditions may be easily imagined.

In most cases other germs of the mouth have been the cause of glandular enlargements. But amongst these micro-organisms there are some which may seriously affect the body. We find sufficient proof in the literature of histories of diseases, of the worst results occurring through infection by means of carious teeth. And as these germs can penetrate into the body, so also there is the possibility of the invasion of tubercle bacilli. Moreover, colds produce occasional swellings of the lymphatic glands. At any rate there is sufficient ground for paying special attention to the condition of the mouth in children, even during the first school years. From

these hypotheses Odenthal, in 1887, in Bonn, commenced his researches on this subject*

They were undertaken especially in consequence of a case which Ungar in 1884, communicated at the Session of "The Lower Rhine Association for Natural Philosophy and Medicine." A tuberculous ulceration of the gum around two carious teeth was followed by swelling of the lymphatic gland. The latter was proved to have been produced by the tubercle bacillus. The infection of the glands also stands in the closest connection with the primary disease.

Odenthal now placed the relation between carious teeth and lymphatic glandular swelling upon a conceivable footing. He examined 987 children and arrived at the following results:--

There were 283 children without carious teeth, and without glandular enlargement—28·6 per cent.

Without carious teeth, and with swollen glands, 275 children—27·8 per cent.

With carious teeth and with glandular swelling, 424 children, 42·9 per cent.

With carious teeth and without glandular swelling, 5 children—0·5 per cent.

Odenthal was also able to determine a constant relationship between the extent of the caries and the size of the swelling. If caries existed on both sides he always found glandular enlargement on both sides.

Later, Rühle communicated the following case:—

A boy with apex affection on the left side had lymphadenitis on the same side of the neck. A swollen gland previously existed in proximity to the lower jaw and connected with a hollow tooth. The swelling was extirpated and proved to

* Carious teeth as an entrance for infectious materials, and as a cause of chronic enlargement of the Lymphatic Glands in the Neck," by W. Odenthal, 1887.

contain bacilli. The entrance of the infection appeared to have been from the hollow tooth.

It can hardly be doubted that in the cases brought forward by Ungar and Rühle the lymphatic glandular swelling was traceable to carious teeth; it was not a localised manifestation of a more extended general disease.

Lymphadenitis is, according to Bergmann, a disease caused by infective germs. In order to provide an entrance for the pathogenic micro-organisms into the lymphatic canals, the protecting apparatus covering the skin or mucous membrane must be defective somewhere in its character.

This accounts for the enlargements of lymphatic glands of the jaw. In our cases the carious tooth forms the *locus minoris resistentiæ* which had lost its protecting covering, the enamel, and so opened the way into the lymphatic channel. By the penetration of the infectious material, eventually also of the tubercle bacillus, into the tooth cavity, acute and chronic enlargements of the glands arise.

Very frequently these swellings are localised manifestations of a general disease. But in many cases the origin of the localized glandular enlargements remains obscure, and here the source is sought in the neglected carious teeth, in the often shocking condition of the mouth in children. If one considers that children's glands present a lesser power of resistance than those of an older growth, and that, further, their return to a normal standard is very slow, we must not be surprised if researches which are made in this direction present a very sad aspect.

Let us now turn to our own investigations. These were undertaken in the summer of 1892, based upon the examination of 269 children. From general observation it must be alleged that the conditions of the mouth were very bad, so that, in addition to uncleanness, a total absence of supervision during the change of teeth and of carious teeth was

noticeable. Frequently they all stood, varied in colour, promiscuously, and the loose remains were many. Not only is the possibility of the immigration of pathogenic germs through hollow teeth into the lymphatic canals out of the question (which in such conditions are open inlets), but digestion must also be injured by the swallowing of decomposed septic masses.

Further, the fact is worthy of notice that children who sat near the window showed glandular enlargement on the left, that is, the window side. This occurred in almost all cases where caries did not exist.

Then as to the establishment of the causative connection between carious teeth and swollen glands, 269 children came for examination.

Table I.

	Boys.	Girls.	Total	Percentage.		
Without carious teeth and without gland swelling	1	11	12	0.89	7.0	4.4
" " " with " "	7	7	14	6.2	4.4	5.2
With carious teeth and with gland swelling ...	78	107	185	69.6	68.1	68.7
" " " without " "	26	32	58	23.2	20.3	21.5
	112	157	269			

All of the 269 children were 6 years old and above. The result also shows, if one takes it that each child possessed 24 teeth,

Total 6,456 teeth = 100 p.c.

Of which 1,069 were carious = 16.5 p.c.

5,387 not carious = 83.5 p.c.

The gland swellings present on—

 Both sides.

111

 One side.

88

 Right side.

40

 Left side:

48

It was proceeded with in the following manner. We prepared lists in which many heads of columns were accordingly filled up. These contained number, name, class, age. Then followed carious teeth, divided into right, left, upper and

lower. The next column was filled up with the glandular swellings. In this was shown whether any existed, and whether they were the size of a pea, a bean, a hazle-nut or larger ; they were also separated into one side, right or left,

Table II.

		pr.cent.	pr.cent.	pr.cent.	pr.cent.
Number of children	269				
Without carious teeth	26	9.6			
With	243	90.4			
Number of "existing" teeth	6456	2400			
" carious "	1069	397	16.5		
" not carious "	5387	2003	83.5		
Children with glands	199	73.96	3.08		
" without "	70	26.04	1.07		
" with glands on both sides	111	41.2	1.7	55.7	
" " glands on one side	88	32.7	1.3	44.3	
On the left side	48	17.8	0.74	24.1	54.5
" " right "	40	14.9	0.61	20.1	45.5

and both sides. In the last heading were remarks as to the condition of health and nutrition. From the list we could gather the following. The children were aged from 6—15 years. There were 112 boys and 157 girls. (See Table I.)

Table II. gives the percentage of the relation of the points to one another.

Next, the first lists were newly made up, so that the conditions of position and number of the carious teeth to the position and extent of the glandular enlargements could be fixed.

At the same time the colour of the blood and the nutrition were here referred to. In order to make the different points harmonize they were compared with one another. It thus happened that the carious teeth gave the proportion or ratio and the gland swellings their condition. None, 0, pea-size, 1, bean-size, 2, hazle-nut and above, 3, and for blood colour

and nutrition, good, 0, medium, 1, bad, 2, and very bad, 3.

The lists were made up for boys and girls separated into definite ages. These contained the divisions of the principal tables as follows :—Blood colour, nutrition, number of carious teeth, number and position of glands, number and condition of glands.

We could then determine the following :—Association of carious teeth with swollen glands 151 cases. In 34 children this could not at all, or only in the least degree, be allowed.

With the 48 left-sided gland swellings there were 189 carious teeth, with the 40 on the right side, 180 carious teeth ; the relation here was also accidental.

The highest number of carious teeth present in one mouth was 14. The maximum of the glands was 12.

If we compare the results obtained with those of Odenthal, we cannot establish a complete agreement between carious teeth and swollen lymphatic glands.

Especially was this the case when carious teeth existed on both sides ; glandular enlargement on both sides could not always be verified.

In the same way lymphadenitis was sometimes found on both sides whilst the teeth were carious only on one side. Whether in such cases, as Odenthal thinks, a transmission is possible through anastomosis of the lymph vessels on both sides appears doubtful to us. Nevertheless we think our researches have cleared up a certain indication of the infection of maxillary lymphatic glands from carious teeth. We may now rightly assume that the majority of such swellings are not of a tuberculous character, but are caused by irritation of non-pathogenic microbes.

In these cases such swellings become simply chronic, and later, after removal of the tooth containing the infection will form again without further injurious consequences. But in the same way pathogenic forms may penetrate and severely

affect the organism. Lower conditions prepare the way for non-pathogenic germs, and the pathogenic ones find the quickest development and extension.

The tubercle bacillus will also exert its deleterious influence on the body ; a carious tooth is the point of exit.

If carious teeth, through the pain which they cause, are injurious to the child, requiring urgent treatment, how much more must prophylaxis be directed against the possibility of infection by pathogenic micro-organisms.

This should be obtained where possible by the filling of the respective teeth. If this cannot be effected extraction is very necessary.

The poorer classes do not understand such conditions, and it is only the wealthy who are able to have their teeth properly supervised. Is it not possible for the community to bring about an alteration by the State. Especially is this demanded during childhood. By a systematic care of the mouths of School children, much suffering could be avoided and many diseases nipped in the bud.

EXPLOSION OF A VULCANIZER—An explosion, April 29th, in the dental rooms of George H. Coleman, on Washington avenue, Lansing, Mich., shook the entire building and startled all in the immediate vicinity. Upon investigation it was found that Dr. Coleman, while busy in his laboratory, was suddenly thrown in a heap and covered with debris by the terrific exploding of a vulcanizer. Several window lights were broken and Mr. Coleman's left hand was badly burned and cut.

A combination of carbolic acid crystals one part, oil of cassia two parts, and oil of gaultheria three parts, makes a very useful remedy for the treatment of putrescent pulp canals, and for injecting into pus pockets in pyorrhœa alveolaris.

British Journal of Dental Science.

LONDON, JULY 1, 1895.

THE SURVIVAL OF THE FITTEST.

It is one of the drawbacks connected with the State control of our Profession that any alteration for the better can only come after a fight in the Legislature. There is, however, the compensating advantage that any change that does come will scarcely be a retrograde one, and that any agitation for relaxation of existing regulations on the part of jealous or discontented outsiders will probably be ineffectual. This is, of course, provided always, that those wishing for the best are able to agree amongst themselves, and, by showing a readiness for conciliation and adaptation, offer an united front to those aspirants whose hopes are centred upon a "leakage." Renewed Dental legislation has recently been much in the air, but the prolonged exposure which the present parliamentary upset seems to promise, may lead to evaporation, and the possibilities of a New Medical Act with Dental modifications will scarcely be regarded (as it should be) by the opposing political forces as a non-contentious matter. Whether either of the two great political parties may be expected to look with more favour than the other upon fresh medical legislation is not a question we can well discuss here, but we will briefly survey some of the factors which may influence the culmination of the struggle for existence.

We have, then, certain influential Dentists, mostly with dental diplomas, and some with medical and surgical ones in addition, who (recognising that the General Medical Council regards their struggle for a high professional tone with sympathy) are anxious, as practising a branch of General Surgery, to be included in any benefits which may

be brought about by a new Medical Bill. On the other hand a sufficiently numerous class, regarding their practice more from a commercial stand-point, but pleased to be recognised as *surgeon-dentists*, resent fresh interference on the part of the General Medical Council, and, perhaps frightened by the threats of some would-be professionals propose to resist any attempts which may be made to interfere with their methods of practice. It may easily be imagined that these latter would, under certain circumstances, be willing to jeopardize the present Dentists' Register, and, in order to free themselves from the irksome control of the Council in covering, would be ready to join hands with another, and considerably smaller, group. Practitioners of this third variety occasionally give evidence of their existence by writing forcibly against the present order of things. From their point of view, Dentistry should be regarded, not as a branch of General Surgery, but as a thing of itself. The General Medical Council, therefore, is, for them, not the proper Body to exercise control, but a College of Dentists, which no doubt could make short work with those who now to some extent manage to evade the Dentists' Act, and which would be a Law unto itself for Educational, Examining, and other purposes. Some sympathy may perhaps be due to these old-fashioned views, especially as there seems but slight chance of their holder's wishes being realized. The Licenses of the Royal Colleges of Surgeons have for years been adding to the ranks men who would not willingly see their diplomas undervalued. Short of some catastrophe, such as the coalescence hinted at above, not even a modification of a College of Dentists seems likely to be demanded of parliament. These unsatisfied ones may, however, reflect with some consolation that their more successful brethren will not get all they want, and they themselves will still be able to pick holes in whatever system may result from the proposed new legislation.

But is there not another party to be reckoned with? The members of this group differ from the former ones, who after all find some protection in the present Register, their

common meeting ground. The *Unregistered* Dental Practitioners(!) who, we believe, are finding themselves inconvenienced by the latest interpretations of Clause III, have already scented the proposed contest in Parliament, and are putting their house in order. A Defence Association is in existence, and a dentist has favoured us with a letter addressed by its Secretary to a member of his laboratory staff. "As this is the only Association dealing with this question, the probability is, that those persons whose names are not in the lists [of the Association] will be ignored both in Parliamentary and other proceedings as having no *locus standi*, and they will thus lose the advantages of amalgamation and union." The entrance fee was to be raised this year from two to five guineas, but there was a certain exemption for those who had not received a formal notice in time. There appears to be yet some hope of admittance for those so neglected or neglectful, but evidently no time should be lost! The Association can scarcely be accused of assuming a title implying that its members are registered under the Act, but the alternative words "or that he is a person specially qualified to practise dentistry" deserve consideration, and may well occupy the attention of the Association whilst waiting for the fray.

AMTIVENINE.—Professor T. R. Fraser has made a most interesting communication to the Royal Society of Edinburgh. It dealt with experiments he has made in the hope of securing immunity in animals to snake poisons. He first satisfied himself as to the amount of the poison which constituted the minimum fatal dose. Having next reduced this quantity, he found he could gradually increase the strength of the injections until the animal could stand a dose fifty times stronger than the one which was originally lethal. Serum from a rabbit which was immunised to thirty times the minimum dose averted a fatal result, and if injected even half-an-hour after the use of venom ordinarily fatal in one hour, promptly stopped the symptoms which had set in, and saved the

animal's life. One rabbit, during two months received enough cobra venom to kill two horses, or 280 unprotected rabbits. Professor Frazer will probably make a further communication at the next meeting of the Society.

A THEORY OF WHOOPING COUGH.—Mr. Thomas Jackson writes to *The Lancet* as follows:—He has always regarded the disease as primarily affecting the peripheral terminations of the trifacial nerves, and secondarily affecting the pneumogastric. We have a disease of childhood—mumps—which chiefly affects the parotid and sometimes also the submaxillary glands. Is it not likely that some microbe may have an affinity for the sublingual glands, and possibly also the submaxillary, specially affecting their epithelial or secreting structures, and causing to be poured into the mouth a quantity of vitiated saliva swarming with morbid products? The mouth, the fauces, and the stomach become immediately infected with the saliva, and irritation is set up in the terminal filaments of the fifth nerve. This nerve supplies the four glands just mentioned, as well as the papillæ at the base of the tongue and other sensitive parts that would be likely to become affected. The irritation passing up the nerve trunk would involve the other parts—the ophthalmic and superior maxillary. This would account for the redness and suffusion of the eyes and the nasal catarrh. The seat of origin in the brain of the trifacial and vagus nerves are closely approximate; so that it is not difficult to understand that an irritation might be communicated, and that the vagus, stimulated in this manner, would set up all the secondary phenomena peculiar to whooping cough. It has been proved that the saliva of man will inoculate the rabbit, and yet no change appears to take place in the blood. There is no metastatic poisoning—in fact, if it were not for the “whoop” the whole train of symptoms could be easily explained as the product of poisoned saliva causing irritation and ulceration at the

mouths of the ducts of the *frænum linguæ*—which is generally attributed to the forcible rubbing against the teeth during cough,—causing heat and pain in the mouth and fauces, producing cough, and causing indigestion and sickness owing to the presence of starch and perverted secretion in the stomach. It is noted that the taking of food excites the cough; and, of course, the process of eating excites the gustatory, and mastication affects the buccal, nerves. He recommends swabbing the orifices of the salivary ducts after each fit of coughing with a 5 per cent. solution of cocaine.

HEREDITARY SYPHILIS.—At a meeting of the Practitioners' Association in Vienna, Dr. Genser showed a three months' old child with an interesting syphilitic perforation through the hard substance of the palate. At birth syphilis was not suspected, but three weeks later discharges from the nose and characteristic rash on face confirmed the origin. He commented on the rarity of this defect in the palate from hereditary syphilis.

THE CARRIAGE OF COMPRESSED GASES.—The Great Western Railway Company has issued notices that Compressed Gases will not be accepted for conveyance as Passenger's Luggage. Cylinders intended for conveyance by Railway must be booked through the Parcels or Goods Offices at the stations, and Steamers connected with this Company will not accept such cylinders. The consignment note for the carriage of these compressed gases contains a long list of Regulations and conditions; amongst them is the following, which manufacturers, anæsthetists, and others interested, will do well to observe:—

“The traffic will not be received or conveyed unless securely enclosed in cylinders of iron or of mild steel of best quality, containing not more than 0·2 per cent. of Carbon, thoroughly annealed after manufacture, of sufficient strength and efficiently tested, and the cylinder securely protected by one of the following descriptions of packing:—

(a) Cylinder encased in closely plaited hemp.

(b) Cylinder fixed in ordinary wooden box without lid, but with rope handle.

(c) Cylinder loose in ordinary wooden box, with lid secured by strap.

(d) Cylinder efficiently protected by closely woven wicker-work, the valve of the cylinder not to project beyond the wicker-work.

SCHOOL DENTISTS.—The following are the Union, Parish, or School District appointments which have been approved by the Local Government Board for the Metropolis. The Central London, North Surrey, Kensington and Chelsea, Hackney, Westminster, St. Pancras, Lambeth, Bethnal Green, Strand, and the Exmouth Training Ship of the Metropolitan Asylum District. The earliest of these appointments seems to be the Surrey one in 1884, but several are quite recent. It would be interesting to see some record of the experiences of the gentlemen who hold these posts. There must be a large amount of interesting material, and the Reports should be accessible for the benefit of dental readers. One way in which good might result would be by the formation of a School Dentists' Association to which we previously alluded. If placed upon a proper footing it would be of material assistance to the holders of such appointments, as well as productive of some interesting statistics.

THE FEE FOR THE L.D.S. ENG.—Amongst the new By-Laws of the Royal College of Surgeons of England, as approved by the Home Secretary, is the following: Section XXV.—*Dental Surgery*.—8. The fee for the certificate of fitness to practise as a dentist shall be twenty guineas over and above any stamp duty. Provided always that, in the case of any person being at the date of the coming into force of this by-law registered by the General Medical Council as a dental student and becoming prior to January 1st, 1900, entitled in other respects to receive such certificate, the fee shall be ten guineas over and above any stamp duty.

TRIGEMINAL NEURALGIA.—At a recent meeting of the West London Medico - Chirurgical Society, Mr. COLLIER showed a man, aged 32, who had been the victim of severe trigeminal neuralgia for over four years. On examination of the nose, several mucous polypi, together with a piece of dead bone, were discovered ; these were removed, and the patient had not suffered any more from his neuralgia. Mr. COLLIER pointed out that since the interior of the nasal cavities was supplied by nerve branches springing from the nasal ganglion of the second division of the fifth nerve, irritation of the nose was almost the most frequent cause of trigeminal neuralgia. Mr. LAKE drew attention to the more common situation of neuralgia in nasal cases, and said that he was interested in the question of necrosis without even a suspicion of specific history.

At the same meeting Mr. BIDWELL showed a boy, aged 17, who suffered from a warty growth below the jaw. This had arisen round the sinus formed from a carious tooth, which had existed five years. He considered that the warty growth was due to the continual irritation of the purulent discharge.

THE ABSORPTION OF TEMPORARY TEETH.—At a meeting of the *Société de Stomatologie*, M. Frey described a case in which he was obliged to remove a second temporary molar for a girl of 14, on account of pain. The roots were of normal length, but very thin, and the base of the crown had disappeared, leaving the pulp cavity widely open. The bicuspid was hidden by a reddish mass very vascular and very sensitive, and M. Frey regarded this as the pulp of the temporary tooth laid bare by the absorption. M. Beltrami thought that the tooth plays a part in the absorption of roots, and suggested that a reflex action was set up by the pressure of the permanent tooth. M. Gaillard pointed out that the condition of things found by M. Frey was quite normal, and M. Magitot also remarked that when the pulp of a temporary tooth has not been opened there is still to be found the sensitive organ mentioned. He alluded to experiments he had formerly made in placing the complete dental sac under an animal's skin and finding enamel, dentine and cement completely absorbed in a few weeks.

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary monthly meeting, May 6th, 1895. Mr. Frederick Canton, M.R.C.S., L.R.C.P., L.S.A., L.D.S., President, in the chair.

The Minutes of the last meeting were read and confirmed.

The PRESIDENT said their first business was to appoint two auditors to audit the yearly accounts. Mr. Curnock and Mr. Sidney Spokes were chosen and consented to act.

The President announced that since the last meeting they had heard with regret of the death of one of their late Presidents, Mr. James Parkinson, and also of a member of the Society, Mr. Mark J. Bloom, of Dublin. The Council had written letters of condolence to the families of both those gentlemen. There was also one other name that should be mentioned, although it was not that of a member of the Society, Dr. Ludwig A. Weil, of Munich, who had died since the last meeting.

The following gentlemen were proposed as non-resident members of the Society:—A. W. W. Hoffmann, L.R.C.P. Lond., M.R.C.S. Eng., L.D.S. Eng., 30, The Parade, Leamington; James Sim Wallace, M.D., B.Sc., 29, St. James' Road, Kingston-on-Thames.

The following gentlemen were ballotted for and elected members of the Society:—Leslie Maury Stocken, L.R.C.P. Lond., M.R.C.S., L.D.S. Eng., Winchester House, Ealing (resident); Francis R. Flintan, L.D.S. Eng., Tower Lodge, Weybridge, Surrey (non-resident).

The LIBRARIAN reported the receipt of the usual periodicals and exchanges. He also stated that the new List of Members would be issued after the annual meeting in June, and that he would be glad to receive any corrections of addresses or additional qualifications.

The CURATOR said the first specimen he had to present to the Society was one given by Mr. S. W. Turton, a student of the Dental Hospital of London. It was an upper model of an extreme example of the saddle-shaped arch, the first molars and bicuspid on both sides being very much driven in towards the middle line. One central only was present, the other having been extracted some months, or perhaps years, previously. He had not himself seen the patient, but

the model was extremely interesting, showing what very great deformity was sometimes met with in such cases.

The kind of irregularity usually met with among temporary teeth was crowding of the lower central incisors, causing a twisting of the median edges towards each other, forming a sort of V. Quite recently Mr. Bennett had received, also from a student of the Dental Hospital of London, Mr. J. W. Dalton, the upper and lower models of a girl aged 4 years, showing this deformity, and also—which was still more interesting—the models of a brother of this child, aged 2, showing also the same deformity. Of course, crowding of the temporary teeth in itself was rare, but it was difficult to quite understand how crowding of the central incisors could take place before even the second temporary molars had erupted. In the child aged 2 the first temporary molars were cut, and the teeth anterior to them; but the second temporary molars showed no sign whatever; nevertheless, the same kind of deformity was well marked; and there was also a crowding of the lateral incisors. The models, being those of brother and sister, together made an extremely interesting series.

It might be within the memory of members that some months, or even years ago, Mr. Macleod showed a very extraordinary skull which belonged to a museum, and was therefore only available as a loan to this Society. The skull seemed to have the most remarkable collection of abnormalities that he had ever met with. Though an adult skull, the right upper canine and right second permanent molar were unerupted, the latter lying horizontally with its crown directed forwards, and having between two of its roots two enamel nodules. On the left side it had a transposition of the first bicuspid and canine, and both bicuspids were so twisted that the buccal sides were turned inwards towards the palate. The left second molar was not fully erupted, and it also had two enamel nodules. Mr. Macleod was good enough to leave this specimen in his hands for the purpose of taking a cast. It was not a very easy specimen to duplicate, but he had taken a cast which he would present to the Museum, and which was he thought, a very beautiful specimen of what might be done by the gelatine process introduced some years ago by Mr. Whitehouse. By no other means would it have been possible to obtain so successful a cast. It showed three of the four enamel nodules, but unfortunately the fourth, which stood on the anterior surface of the left molar, was so very difficult of access—in fact could hardly be seen at all—until the tooth was

taken out—that to get a cast *in situ* of it was absolutely impossible.

Mr. GARTLEY presented a specimen to the Museum, showing transposition of a first upper bicuspid and canine.

Mr. BRUNTON presented models, showing transposition of laterals and canines occurring in a patient 54 years of age.

Mr. SCHELLING presented some interesting specimens of old mechanical work which had been in the possession of Mr. A. Pitowski, a former member of the Society.

Mr. COXON asked Mr. Bennett how he had proceeded to get the cast which he had exhibited.

Mr. BRUNTON asked what grounds Mr. Bennett had for pronouncing the skull to be that of an adult.

The CURATOR said that the appearance of the sutures and the position of the teeth was a considerable guide. The bicuspid was erupted; the second molar on the left side was not fully erupted, but was well through the bone, and there was a considerable cavity where the wisdom teeth at some time had been. Unfortunately, either at the time the skull was prepared, or at any rate at some time before he had the opportunity of seeing it, the wisdom teeth dropped out. He had, therefore, no means of judging how far the development of these teeth had proceeded, but the crypts were large, and therefore they must have been pretty well advanced. In reply to Mr. Coxon, he might state that the process adopted was perfectly well known. It was described by Mr. Whitehouse years ago, and they were all familiar with it. In this particular instance nothing was done to the skull beyond painting it with a thin coating of oil to prevent the liquid gelatine sticking to it. Nothing else was done at all.

DISCUSSION.

Mr. WYNNE ROUW said Mr. Bennett had stated that the transparent zone was not due to calcification in the tubes. He should like to know what it was due to, because at present he was completely in the dark on the subject.

Mr. CUNNINGHAM suggested that it might be perhaps well to examine the microscopical sections before proceeding further with the discussion, because one felt a little difficulty in criticising and coming to conclusions upon demonstrations made upon the screen. With regard to some of these, he did not quite see them with the eyes of the demonstrator himself, and thought that possibly the thickening of the tubes, and so

on, were somewhat owing to the diagonal cut of some of the tubes, causing them to exhibit a kind of appearance that might be seen in teeth that were not pathological at all. He believed that he could reproduce a photograph on the screen which would be very like one of Mr. Bennett's, and yet would not point to anything resembling the zone of transparency or to any pathological condition. If they examined the specimens they might be able to discuss the subject better.

Mr. MUMMERY said the paper was a very interesting contribution to the pathology of caries. He thought it possible that the occurrence of the enlarged tubes and tube walls might be accounted for in another way than that described by the author. It was well known that there was an area of decalcification in caries described by Miller, and that this area was found in advance of the micro-organisms. In these cases where there had been a spontaneous arrest of caries, it was possible there might have been an old transparent zone and a fresh zone of partial decalcification due to a further advance of caries. Afterwards when the caries had been arrested, both zones were shown, that was to say, there was a transparent zone invaded by a zone of fresh decalcification, and so a few micro-organisms and also the thickened tubes might be seen. It would be interesting to know whether the specimens shown, which he believed had been all ground, were at all soft, if they could have been cut with an excavator, because of course, in Miller's zone a portion of softened dentine could be cut out perfectly free from organisms.

Mr. SEFTON SEWILL said that having had an opportunity of examining a large number of such specimens, he fully agreed with Mr. Bennett in the conclusions he had drawn. With regard to the theory of vital action, seeing that the tooth structure was composed of 75 per cent. or more of mineral matter, and contained no blood vessels, and that it was impossible to point out any place in the body where vital action took place in the absence of any blood vessel, he thought it was evident that there could have been no vital action in the cases referred to. He thought the specimens would have been very interesting if they had been stained for micro-organisms. They could then have seen more exactly where the micro-organisms had penetrated, and might probably have seen, as Mr. Mummery had pointed out, that they must have gone very near indeed to the zone of translucency. He thought the appearances shown might be perfectly well produced by decalcification and by nothing else; also that the

pipe-stem appearance was sufficiently accounted for by the swelling of the dentinal tubules. Several gentlemen had mentioned the fact of these appearances being seen in teeth worn on artificial plates. They must have resulted from dental caries produced artificially, and no doubt Mr. Bennett had put them entirely on the right track as showing that there was no question of vital action in the zone of translucency.

Mr. STORER BENNETT said he wished to draw attention to one point which seemed to have escaped attention. The author had stated in the early part of his paper that this was an investigation set on foot for the purpose of determining a certain thing, namely, whether there was any increased calcification, or, on the other hand, softening in the zone of translucency. The evidence of the paper went distinctly to show that there was no vital action in the tooth, that there was no attempt at calcification to arrest the approach of caries; but on the other hand, what had formerly been described as the translucent zone, and which was supposed at one time to be a barrier set up against advancing caries, was pretty clearly shown by the specimens to contain enlargement of the tubes, not contraction, as there must be if excessive calcification had taken place in them. He did not quite understand from Mr. Mummery whether he proposed to suggest that there were two zones of translucency—one the old zone described by the earlier writers, and the other one undoubtedly due to acids, as described by Dr. Miller—whether he wished to speak of two zones or only one zone, one and the same thing. The point he wished to enforce was that the paper, as far as he could understand, was specially aimed at examining the question as to whether there was or was not a vital action in these teeth to arrest the caries. The fact that this zone was found very well marked in teeth that had been worn on artificial plates appeared in itself a most convincing argument against any vital action being possible in caries.

Mr. MUMMERY said that what he meant to convey was, that whatever the cause of the translucent zone, whether produced by calcification or decalcification, he thought that the appearances shown suggested an encroachment upon the zone first formed, by the area of decalcification in front of freshly advancing micro-organisms. The two zones had encroached upon one another, there had been caries and arrested caries alternating, and the decalcifying area had really worked, as it

were, into the zone of translucency, because in most of the specimens the peculiar appearances of the dentine, showing some alterations in the tubes, were near the line of micro-organisms, not very far down in the zone of translucency.

Mr. J. F. COLYER asked Mr. Bennett whether he was quite sure that in the specimen of the incisor of which sections had been shown, caries had not started previously to the mounting of the tooth on the plate. He would have liked to have seen Mr. Bennett deal with the chemical analyses brought forward by Miller in his book, and which he (Mr. Colyer) always considered the most telling argument against the devitalization theory. He would also ask how Mr. Bennett accounted for the translucent appearance obtained in the dentine long before the whole of the enamel was quite disintegrated. Every now and then they met with a translucent appearance in teeth where there was no caries, but where they had abrasion or erosion. The appearance appeared to be exactly similar to that which was got in caries.

The PRESIDENT said he was afraid they could hardly adopt Mr. Cunningham's suggestion of examining the specimens before further discussing the paper. Their object was rather to bring the meeting to an early close, so that there might be time for an examination of the specimens under the microscope subsequently. Therefore, if no member had any other remark to make, he would ask Mr. Bennett to reply.

In reply to the remarks on his paper, Mr. F. J. Bennett said:--Mr. Mummery's point was that the transparent zone had subsequently been affected by caries, that the old caries might have produced the transparent zone, but that a later attack of caries might have invaded the transparent area and caused the enlargement of the tubes in this area. As a matter of fact there was but one attack of caries, although it had continued active at one point, it had become arrested at another. The flat masticating surface from which the section was made had the polished and eburnated appearance of arrest, although part of the circumference at the jagged enamel margin had the caries still alive. But enlarged tubes in the transparent area were to be found not only near the active caries, but in places far removed from it. Again, if a transparent area had become carious, how was it that it did not also take a stain in a similar manner to that where caries was active? Dr. Miller had said that there was a very small area in front of the advancing caries which did not become

stained. That was so, but not such an area as that under consideration.

Mr. MUMMERY: A very wide area was frequently unstained.

Mr. F. J. BENNETT thought that all the transparency shown in the specimen was part of one and the same zone of transparency, and was not of the kind mentioned by Dr. Miller. With regard to the specimen which he handed to Mr. Colyer, there was no trace of decay having occurred previous to the mounting of the teeth on the plate; it was unlikely that carious teeth would have been used for such purposes, and moreover, the places affected with decay were such as could not have been exposed to its influence during life, namely, where the tooth had been cut in half and fitted to the plate, and around its attachment to the pin.

In reply to Mr. Colyer's remark that there was a zone of transparency in attrition and in erosion, he (Mr. Bennett) had made a number of sections, expecting to find evidence of a transparent zone in attrition, and had only been able to demonstrate anything resembling such in one case, and in that one he believed there were also indications of softening. He would be glad to see specimens of transparency in attrition, still more so in erosion. Beyond the secondary deposit at the margin of the pulp cavity, he had not seen the faintest tendency to increased calcification, or to a zone of transparency in erosion.

Mr. Cunningham had suggested that specimens on the screen were a little deceptive, and that when they came to the microscope itself they might read a different story. All he (Mr. Bennett) could say was that Mr. Cunningham was welcome to make a close and critical examination of the microscopical specimens themselves, which were on view in the next room, and to see if they did not accord with the photographs.

The PRESIDENT tendered the thanks of the Society to the reader of the paper and to those who had brought forward Casual Communications.

Labarraque's solution is made by decomposing a solution of chlorinated lime with one of NaCo^3 . This is a pale liquid with an alkaline re-action. It is a valuable agent in putrescent conditions, and will destroy all foul odours. The preparation should be kept in glass-stoppered bottles and in a dark place, as it is affected by air and light.

STUDENTS' SOCIETY, NATIONAL DENTAL HOSPITAL.

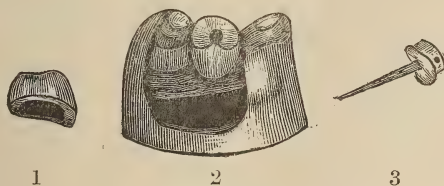
The usual monthly meeting of the Society was held on Friday, June 7th, at 8 p.m. The President, Alfred Smith, Esq., being in the chair.

The Minutes of the previous meeting were read and confirmed, and the usual welcome accorded to visitors present.

CASUAL COMMUNICATIONS.

The PRESIDENT exhibited a fractured right lower molar tooth. The patient had been to a chemist, who had attempted to extract the tooth, but in so doing had removed the entire crown, leaving the pulp exposed, and unbroken. The case was interesting on account of the amount of pulp exposed.

Mr. HARRY ROSE brought forward a case illustrating the manner in which one of Ash's tube teeth could be converted into a kind of Logan crown. He effected this by drilling a large cavity with a carborundum point, in the base of the tooth, and then making it undercut. (Fig. 1). The cavity was practically an enlargement of the tube canal for about two-thirds of its length, care being observed not to weaken the walls.



The root having been prepared, and the canal drilled out, a pin was fitted to it, and a cap fitted and soldered to the pin. (Fig. 3).

A strip of gold was then bent up and soldered so as to form a small collar, of such a size as to fit loosely into the cavity formed in the tube tooth, and it was trimmed up, so that the edges of the collar were on the same level as the under surface of the tooth.

A thin film of hard wax was next melted on the gold cap, and the tooth with collar in position was pressed on to it. If the edge of the tooth has been moistened or oiled it will part

readily from the wax, leaving the collar in position adherent to it.

It is now sunk into an investment of brickdust and plaster, a small amount is also placed inside the collar, at the same time a piece of iron wire is bent at such an angle, that one end is in the investment, and the other is bent over and inserted into the collar, thus supporting it, so that it can be easily soldered without fear of displacement. The collar is next perforated with several holes, by means of a drill in the dental engine, and then the tooth is finally adjusted to it. The tooth is then cemented to the cap and collar with Caulk's diamond, or other cement, and it is ready to adjust to the root in the mouth. (Fig. 2).

The operation of drilling the hole in the tooth, with a carborundum point and making it undercut, occupies about twenty minutes.

Mr. H. ROSE also called attention to a valuable collection of ancient instruments for tooth extraction (some of which were about 300 years old) which he had kindly brought to the meeting.

Mr. R. E. NICHOLLS showed a model of the superior jaw of a patient, æt. 11, wherein the temporary laterals had been retained and the permanent laterals were occupying the positions of the canines. The temporary teeth were finally extracted and the space closed well. Mr. Nicholls also showed a lower model of the mouth of a patient, aged 30, the laterals of which were directly behind the centrals and raised upon an eminence: the laterals were removed on account of irritation to the tongue.

Mr. GLASSINGTON showed a left upper lateral having two cusps arising from the lingual surface.

Mr. H. W. MOORE then read a Paper on "Ancient Dentistry," which is published on page 591.

DISCUSSION.

In the discussion which followed, Mr. Alfred Smith remarked that it was to be regretted that cremation was so prevalent amongst the Ancients as it had undoubtedly destroyed much valuable evidence of the *modus operandi* of Ancient Dentistry.

Mr. HARRY ROSE said that he had listened to Mr. Moore's paper with great satisfaction. Evans's work on "Crown Bar and Bridge Work" seemed to show that Ancient Egypt

tian dentistry was somewhat crude : in his opinion many of the so-called Ancient Egyptian Gold Fillings were merely traces of the custom amongst the people of gold-plating their natural teeth.

Mr. GLASSINGTON mentioned the case of a patient who came to him having a cervical carious cavity which had been filled with osteo, on the surface of which was a small piece of gold plate retained in the filling by means of two pins : he thought possibly this was an ancient method. He was of the opinion that considering the instruments the ancients must have used, the work was very good.

The PRESIDENT then moved that a hearty vote of thanks be given to Mr. Moore for his instructive paper, and to those gentlemen who had brought forward Casual Communications, especially mentioning Mr. Harry Rose's interesting exhibit of Ancient Instruments.

This was given and the meeting adjourned until Friday, Oct. 11th, when Dr. Pare will read a paper on "Photomicrography."

STUDENTS' SOCIETY, LIVERPOOL DENTAL HOSPITAL.

A "Clinical Meeting" of the above Society was held on Friday evening, the 14th inst., when the following gentlemen demonstrated :

Prof. Paul : Dental Microscopy.

Mr. Gillmour : Gold and Tin Filling.

Mr. Rose : Gold Filling with hand-mallet.

Mr. E. A. Mansell : Banded Logan.

Mr. Bates : Gold Crown.

During the discussion which followed, Dr. Gemmell showed the Rumboll-Birch Inhaler for Gas or Ether. The following gentlemen took part :—

Messrs. Nixon, Mansell, Lloyd, Kaiser, Woods, Bates, Pritchard, and the President (Mr. Rose).

A vote of thanks to the President, and Institutors of the Clinic terminated a most enjoyable and instructive evening.

Dental News.

BREACH OF THE DENTISTS' ACT.

PROSECUTIONS AT GRIMSBY.

At the Grimsby Borough Police Court, Mr. James Rycroft, of No. 202, Victoria Street, was charged with a breach of the Dentists' Act, 1878, that he being not yet registered under the Dentists' Act, 1878, and not being then a legally qualified medical practitioner, did unlawfully take or use an addition or description, namely, "Grimsby Dental Surgery," or some other title, addition, or description, implying that he was registered under the said Act, or that he was specially qualified to practise dentistry.

There was a similar summons against Mr. Arthur James Browning, of Hainton Villas, Hainton Street, that he did use the word "Surgery." Mr. R. M. Turner, instructed by Messrs. Bowman and Crawley Bovey, prosecuted on behalf of the Dental Association. Mr. Bloomer defended Mr. Rycroft, whilst Mr. Browning was defended by Mr. A. Mountain. Both defendants pleaded guilty.

Mr. Turner said that these cases were taken under the Dentists' Act of 1878, which provided that people not registered or qualified practitioners must not appear before the public as qualified, and get them to go to their surgeries believing that they would get the benefit of skilled advice and assistance. The penalty that could be imposed for a breach of the Act was not to exceed £20. The statute was for the benefit of the public health, and it was their duty to see that it was stringently observed. When Mr. Brown, from the Dental Association, called upon Mr. Rycroft, that gentleman admitted an advertisement in the railway time table calling his place the "Grimsby Dental Surgery." Upon his door he had "Manufacturer of artificial teeth," "Consultations free," "Teeth extracted painlessly." This showed that artifices were used to see how close he could run to the Act.

In the case of Mr. Browning, he carried on business in Hainton Square, Grimsby, and called the place a "Surgery." This showed that operations were performed, and he would point out the danger of operations being performed by unskilful men. His advertisement showed that chloroform was administered, also freezing and ether.

The Mayor said anyone could pull out a tooth.

Mr. Turner said he quite agreed with the Mayor. Anyone could take off a leg, but they would have to take the consequences.

Mr. Bloomer said that on behalf of Mr. Rycroft, he had been in practice in the town for twelve or fifteen years. He had had a business of his own for six years, and before that time was assistant to Mr. Smith, a registered dentist. Mr. Rycroft had neglected to pass an examination and obtain a certificate but regretted that he had not done so.

Mr. Mountain, on behalf of Mr. Browning, said he wished to point out that the only word used by his client was "surgery," and it was doubtful whether the Act applied there, but it was not thought advisable to fight the case. The Act only referred to the words "dentist" and "dental practitioner."

The magistrates retired, and upon their return, in a few minutes, the Mayor (Alderman Palmer) said they took into consideration the fact that these were the first two cases that had come before them, and a fine of 21s., and costs 11s., would be inflicted.

REASONABLE CHARGES.

At the Doncaster County Court, on the 30th ult. the case of Wallis v Masters was heard. It was an action by a Doncaster surgeon dentist to recover from an ex-Mayor of Doncaster £32 12s. for services rendered. The account commenced in July, 1891, and continued till December, 1892. The services consisted of operations for Mrs. Masters and Miss Masters, and for regulating Miss Masters' teeth (for which 20 guineas were charged). There had been a good deal of correspondence, the defendant's statement being that the charges were exorbitant. The defendant had paid £15 into court. The real point was whether the charges were fair and reasonable.

In cross-examination plaintiff said when he was asked he supplied such particulars as he deemed necessary. He did not think that 10s 6d. for filling a child's tooth was exorbitant. If he could get people to pay a guinea he should charge it (Laughter). His regular fee was 10s 6d. There was regulating and regulating. The regulation of Miss Masters' teeth was a special case. In re-examination plaintiff said that in

similar cases to this he had charged and had been paid more than he now charged. Dr. Catt, of Scarborough, and Mr. Frank Harrison, of Sheffield deposed that plaintiff's charges were reasonable. Defendant said when the regulation of the teeth was mentioned plaintiff said it was a simple and every day operation. In cross-examination defendant said he did not wish to pay less than anyone else. Mr. Lodge of Rotherham, said 5s to 10s. was a fair charge for filling, according to the material used ; and 10 to 12gns. would be the outside charge for the regulation.

The Judge, in summing up, told the jury that his opinion, considering the position of the parties, was that the charge for filling was not unreasonable. As to the regulation of the teeth, they must judge of the witnesses' statements. The jury found for the plaintiff for the full amount.

APPOINTMENTS.

(Victoria Dental Hospital of Manchester.)

Mr. John Butterworth, L.D.S. Eng., House Dental Surgeon to the above Institution has been appointed by the Committee of Management to the post of Tutor to the Dental School in connection therewith.

Frederick Rcse, L.D.S., R.C.S. Eng., Hon. Dental Surgeon, Stanley Hospital, Liverpool.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications : name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only, and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
6. The Journal will be supplied direct from the office on PREPAYMENT of subscription as under :

Twelve Months (post free) - - - 14s. od.

Post-office Orders to be made payable at the Langham Place Hotel Office, to G. E. Sklivos, 289 & 291, Regent Street, W. A single number sent on receipt of seven (penny) stamps.

British Journal of Dental Science.

No. 660. LONDON, JULY 15, 1895. Vol. XXXVIII.

NITROUS OXIDE AND OXYGEN.*

By A. B. WOLFENDEN, L.D.S.I.

Mr. President and Gentlemen :—The subject I venture to offer a few remarks upon this evening has not yet, I believe, occupied the deliberations of this Society. In spite of all the conservatism which our profession affords, it will be our duty to frequently relieve suffering humanity by the extraction of teeth. The best means to accomplish this end in a painless manner, and at the same time with the least risk is forced to have our best and first consideration. We are waited upon at all times of the day, by patients often in the most unfitting condition, and requested to administer gas to alleviate their pain ; by some who have undergone long periods of suffering, whose health is much impaired, and at hours of the day the least favourable for the administration and operation taking place. This being so, no wonder our interest is excited in any new discovery with which science or inventive genius presents us.

At the outset it must be confessed one has nothing new to offer to what Dr. Hewitt has already said ; but after a considerable experience with the use of the mixed gases, I can fully and confidently bear testimony to all the advantages claimed by him for this method of producing anæsthesia.

* Read at the Manchester Odontological Society.

For young children, anæmic females, aged people, patients with affections of the heart or lungs, the mixture is most desirable : in fact, I know of no case where it is advisable to give gas, but that a small additional per cent. of oxygen is preferable.

When oxygen is given with nitrous oxide there is an absence of the lividity which is usual when nitrous oxide is administered alone ; there is also absence of the loud stertorous breathing one gets with the customary method, while the patient is altogether more calm and still, instead of being rigid as with nitrous oxide alone. As a rule we get relaxation, which is a decided gain when operating ; as when a gag slips, there is little difficulty in pressing the jaws apart, which is almost impossible with the old system. The tongue is readily pressed out of the way of the teeth to be extracted, while engorgement of the soft parts of the mouth and throat does not take place, and so impede or obstruct the air passages.

It may be urged that there is no necessity for a change, that nitrous oxide is safe, and that it has served us well in the past. Arguments like these cannot stand when we reflect on recent fatalities. Most of these were accompanied with symptoms of asphyxia, and in two cases there were enlarged tonsils. This last condition suggests that extra care should be exercised where these enlargements are present. Some of those unfortunate mishaps occurred in the hands of gentlemen with large experience who were capable of dealing with every emergency that might arise.

Many present will recollect Dr. Hewitt's case of Laryngeal Spasm which occurred about the latter part of 1887. The patient a man thirty-five years of age, in good health, requested that a tooth be extracted under nitrous oxide gas. It was discovered that the muscles of the neck and throat were abnormally rigid, whilst in addition to the stiffness o

movement which existed in the cervical region, the jaws could only be separated to about one fourth of their normal extent. Beyond this rigidity the patient presented no obvious peculiarities in his appearance. Nitrous Oxide was administered in the usual way, when immediately after the tooth had been extracted, symptoms of asphyxia presented themselves. All available means were used to restore breathing, but to no effect, and had it not been for the skilful performance of Tracheotomy, in all probability the patient's life would have been lost. One fears to speculate as to the result of a similar case in the surgery of a private practitioner who was without the aid of a specialist.

Dr. George Johnson, who is celebrated as an investigator of the action of the arterioles, gives the following explanation how patients are affected when inhaling Nitrous Oxide. "Generally, during the first few seconds the pulse and the breathing are quickened under the influence of emotional excitement. In the next stage the breathing is slow and shallow, while the pulse is remarkably full and firm. Then after another brief period, the pulse suddenly becomes almost imperceptible, the features, and the general surface of the body are livid, the pupils are widely dilated, and the muscles are rigidly contracted or convulsed, as in the first stage of an epileptic fit. The inhaled nitrous oxide undergoes no chemical change, but rapidly diffuses and replaces the oxygen in the lungs and the blood. Black unoxydised blood passes into the left side of the heart and systemic arteries, and excites the contraction of the muscular arterioles,—those contractile tubes whose office it is, after the manner of stopcocks to regulate the blood supply to the capillaries and the tissues. In the early stage of the inhalation, the blood, although not aërated, is allowed to pass freely through the lungs, but at a later stage the blood becoming more completely deoxydised and passing

through the systemic capillaries without the usual interchange of materials which occurs between aerated blood and the tissues, returns to the right side of the heart and lungs in so abnormal a condition as to excite the contraction of the resisting pulmonary arterioles. The resistance thus offered to the passage of the blood through the lungs lessens the blood supply to the left side of the heart, and the systemic arteries, and explains on the one side the systemic arterial emptiness, with feebleness or even complete cessation of the pulse, and on the other the systemic venous fulness with lividity of the skin, while the epileptiform condition is explained by the sudden and extreme diminution of the blood supply to the brain."

In a paper "On the Physiology of Asphyxia" which appeared in the *Lancet* for April 1891 by Dr. Johnson, the two following experiments are related. Into the trachea of a small dog, prepared with the chest and pericardium opened and kept alive by artificial respiration, a glass T tube was introduced, through which pure nitrous oxide gas was passed into the lungs, whilst the expired gases escaped into the air. First the left, then the right cavities became distended, and in one minute the heart's action had nearly ceased, with over distension of the right side, then without loss of time, inhalation of nitrous oxide impregnated with the vapour of nitrite of amyl was substituted for the pure N_2O by means of a two way stopcock, and the result was that almost immediately the distension of the right cavities began to subside, and in two minutes they had nearly regained their normal size.

The second experiment was performed upon a rabbit previously narcotised by morphia. The chest and pericardium being opened, and the animal kept alive by artificial respiration, nitrous oxide was substituted for air. In half a minute there was distension of the left cavities followed in one minute by distension of the right. In one minute and a half

enormous distension of the right cavities was observed, with convulsions. In two minutes and a half the heart stopped. Artificial respiration with air was now resumed. The heart immediately recommenced to beat, and its distension was now removed. The heart's cavities were of the normal size and fulness in seventy seconds after the readmission of air into the lungs.

If the hearts of animals are affected in this way when inhaling nitrous oxide, it is a permissible deduction that the hearts of our patients are affected in a like manner.

The two chief dangers we have to fear, when administering an anæsthetic, are asphyxia and syncope. At the completion of a nitrous oxide administration, symptoms of the former are always present, but happily, on the readmission of air to the lungs they quickly pass off. It will be observed that when a suitable proportion of oxygen is given with N_2O , these signs of asphyxia are not present. The breathing is more natural and regular, the circulatory system is almost normal, while the natural colour of the skin, and the absence of the jactitation or epileptiform movements, proves that there is a better blood supply to the brain.

Those most liable to syncope are the anæmic, those recovering from acute disorders, or who are debilitated by any chronic disease, those suffering from definite cardiac lesions, and those of a highly strung nervous temperament. Such may be much more safely given the mixture than N_2O alone, as the oxygen prevents an overcharged condition of the heart, and also avoids stress being thrown upon that organ.

Dr. Hillischer of Vienna, claims to have employed nitrous oxide and oxygen for dental operations in over 15,000 cases, and says he could not do without it. He no longer makes any choice in his patients for this anæsthetic, and, as the result of numerous experiments in his private practice, does

not hesitate to administer it to patients suffering from grave diseases, such as with serious defects in the valves of the heart, some with fatty degeneration of that organ, several with struma, lung diseases, epileptic patients, and convalescents after pleuritis, in which cases he has produced good narcosis, and further, that he has anæsthetised a large number of women with it both immediately before and after confinement, also during menstruation, without any accident, that he has given it to children from four years of age, and to old people of seventy-six.

Your essayist has made observations and taken notes in one hundred cases as they have occurred in practice. The ages of the patients varied from five years to sixty. Seventy were females, and thirty were males. The peculiarities or behaviour looked for under the influence of the gases were as follows:—If the patients were faint, screamed, struggled, sick, also if relaxation or rigidity was present. Ninety-three were perfectly quiet and felt no pain, six screamed but knew nothing, three struggled, four were sick and vomited, while in eighty cases there was relaxation, and in twenty slight rigidity.

Those patients who were sick had all taken food shortly before inhaling the gases, and in these cases experience has taught me that less oxygen would have been better.

On three occasions the administrations have been repeated, twice with an interval of half-an-hour, while in one case there was only an interval of a few minutes, and in all of these cases there was complete success.

Our profession is deeply indebted to Dr. Hewitt for his continued investigations and labours in this branch of our calling, and to him our best thanks are due.

In conclusion, I am convinced that the mixture is immensely superior to N^2O alone, and that it has come to stay-

Sooner or later the old system will have to give way to the new, and further, I have no hesitation in saying that you gentlemen who are responsible for the training of our future dentists, will at no very distant period be advocating this method of producing anæsthesia.

NELSON'S PETROLEUM BLAST FURNACE.

By HARRY ROSE, L.D.S. Eng.

After an experience of ten months, during which time this apparatus has been in use two or three times a week, I feel that I can speak with some amount of confidence as to its merits, and it is my conviction that it will do more to bring continuous gum work into general use, than anything that has preceded it.

One possesses now, a ready, clean, expeditious, and economical way for firing cases.

Ready, inasmuch as it is only necessary to fill the steel reservoir with benzoline in order to start it. Clean, because one may go through the whole operation without soiling the hands, there being neither smoke, dust, nor smell.

It is expeditious, when one takes into consideration that, starting from the cold, a case may be fused in about three quarters of an hour, the sole trouble being to turn on and regulate the blast.

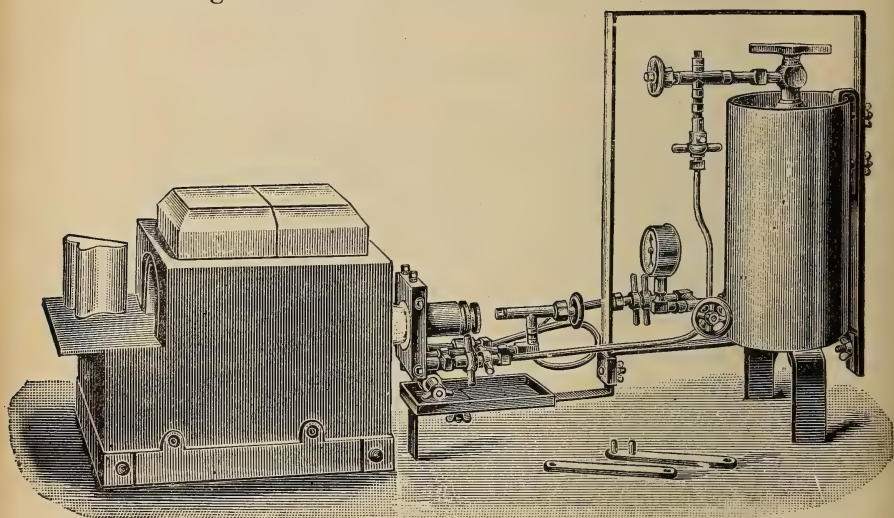
Now let us see what we can do with it. By means of a pressure guage and regulator we can increase or decrease the blast at will, so that we have not to fear, as in a coke furnace, the heat going down just as it is most wanted.

By being automatic in its action, neither blower, bellows,

nor chimney is required, in fact the furnace can be worked, so to speak, on the dining-room table, without so much as warming it.

A great feature is that the artist is enabled to concentrate his thoughts and actions solely on his work.

Another most important item and one that simply relegates gas furnaces, coke furnaces, and every other furnace to a tranquil rest in some quiet corner, is the fact that the case cannot get smoked or discoloured.



The experience of the writer, after numerous experiments, and general work, during the ten months he has been using this furnace, has been that neither the blast itself, nor the waste vapour at the draught exit, has any effect on either the gum enamel, or compound used by him, in fact it seems to improve the brilliancy of the gum.

If the benzoline is pure, there is practically no smell from it, and with respect to economy, a case can be fused at a cost of about fourpence. It is not often that we can speak in such

flattering terms of any appliance, but when one has been over twenty years in perfecting the materials for this work, it is only natural to evince the pleasure he feels in finding an appliance that completes his success.

THE PROGRESS OF DENTISTRY.*

By Mr. R. P. ROBINSON.

Mr. President and Gentlemen,—The subject I have the honour of introducing to you this evening, is I think a slight departure from the class usually subjected to discussion by this Society. But nevertheless, as I am sure but few of us are thoroughly acquainted with the history of our Profession, there never having been published a complete record, I only hope that the collection of facts I am bringing before your notice this evening, will prove interesting, if not entirely new to all present. To deal with this subject fully, I should be obliged to discuss it under four or five headings and sub-headings, but such is not my intention. As time is limited, I shall arrange my subject in the following manner :

(a) Dental Origin.

(b) Dental progress from the middle ages to the present time.

(1) Extraction.

(2) Filling.

(3) Mechanics.

Dental Origin.

That dentistry was practised as a distinct department of Medicine, by the early Egyptians, and ancient Greeks, we

* Read before the Liverpool Dental Students' Society.

have little room for doubt, there being certain evidence preserved to the present day. On examination of the mouths of mummies and skulls, deposited in our home Museums, we find some of the teeth apparently filled, and lost ones artificially replaced.

Antiquarians and discoverers of modern times assert that the early Egyptians were far advanced in the dental art, there having been found teeth ornamented with gold, and dentures made of sycamore or other hard wood, mounted in gold and fastened by means of ligatures of gold or silver wire to their adjoining natural neighbours. But however, in spite of this practical evidence of early wisdom, suggestions have been made that the knowledge of these early dentists was limited, as was also their practice. In this age we are told there were certain laws requiring all physicians and healers to adhere strictly to certain remedies prescribed by these laws, on pain of death for the slightest transgression of them. It is reasonable therefore to suppose that the theoretical knowledge these early dentists did possess was shrouded in secrecy, being handed down from generation to generation.

The ornamentation, or filling of the teeth in mummies before spoken of, has in some cases proved to be mere gilding of their surfaces, which is explained by a custom the Egyptians had of gilding the eyes, ears, and teeth of their deceased friends before entombing them.

Little indeed can be said of the methods of operation adopted by the early Greeks and Egyptians, but stray facts and diagrams, one of which I am able to show this evening, prove that their instruments were few and of a very primitive and awkward character. At this very early age the use of the forceps was known by only a very limited number, among whom may be mentioned Heraclidus and Erasistratus recorded as dental operators. It would perhaps be as well at this

point to explain briefly the diagram of instruments before you. I shall therefore quote a short portion of one of the works of that famous surgeon Ambrose Paré.

“Teeth are drawn either for that they cause intolerable pains which will not yield to medicines, or else for that they are rotten and hollowed, so that they cause the breath to smell, or else that they infect the sound and whole teeth, and draw them into like corruption, or because they stand out of order. If the tooth be much eaten, the hole thereof must be filled either with lint or a cork, or a piece of lead well fitted thereto, lest it be broken under your forceps, when it is twitched more straightly to be plucked out, and the root remain in a short time to cause more grievous pain. The patient must be placed in a low seat, bending back his head between the tooth drawer’s legs, then the tooth drawer shall deeply scarifie about the tooth, separating the gum therefrom, with the instruments marked with the letter A. Then if spoiled as it were of the wall of the gums, it grows loose, it must be shaken and thrust out, by forcing it with the three pointed levatorie noted with the letter B, but if it stick in too fast, and will not stir at all, then must the tooth be taken hold of with some of these toothed forceps marked with the letters C D E first one then another, as the greatness, figure and site of the tooth shall seem to require.”

What these instruments were made of it is difficult to state, but Erasistratus is said to have possessed an instrument something like those shown on the diagram, but made of lead, which he advocated the use of only in cases of loose or relaxed teeth. Hippocrates (500 B.C.), was however the first who really put his ideas concerning the teeth into writing. Galen (150 A.D.), is said to have treated the subject more fully than other ancient writers. He taught that the teeth were true bones and were formed in the foetus, but did not

become apparent until after birth, and also declared that the canine should be called the eye-tooth, because it received branches from that nerve which supplies the eye.

It is indeed difficult to state at what year dentistry was first practised in England as a profession. It is probable however, that the first dentist of any importance was Thomas Berdmore who was Dentist to George III. Early in the seventeenth century tooth drawing was practised as a regular trade even in London, as may be seen in the pictures before you, where teeth were taken out wholesale by the best class of dentist whose shops were continually thronged with people enduring the slightest pain, but for whom no other remedy was possible. It is no doubt well known to many of us that the only cure for tooth-ache at one time was the extraction of the offending member. Now this operation was indiscriminately resorted to on every possible occasion when pain was felt, by the doctors, apothecaries, barbers, and even blacksmiths throughout England and Scotland, who used instruments little better than those shown on the diagram. It is stated that in some parts of Scotland at the present day, the blacksmith still fulfils the offices of a dentist in this respect.

The first idea of improvement on the old time leaden forceps was the pelican, of which practically nothing is known, and for which no date is given. It would seem to be an instrument of little importance since nothing of its uses has been recorded.

We have then another form of extracting instrument invented in the early part of the eighteenth century, the key by Garengéot, with which most of us are familiar, the different forms of which are before you this evening. It is, however, interesting to state that even at the first appearance of our more modern forceps and indeed many years after, this key instrument held a most popular and barbarous sway.

The first reasonably complete set of forceps recorded was the work of Dr. J. F. Flagg 1821, and these were well received by the profession. Maynard's improvement upon these was made by placing a point on the outer blade of the instrument for the purpose of perforating the alveolus. The improvements made in the manufacture of forceps have been very varied even from fifty years back, an illustration of which I have placed before you.

To enter into a fully detailed description of the many methods that have been employed in the dental operation of filling would mean writing a book. I shall therefore discuss the most interesting facts up to the present time. There seems to be great doubt in the minds of many as to the origin of filling teeth, and by whom this operation was introduced. Celsus has perhaps the first claim to filling teeth, but this was only with the object of extracting them, still this idea gave place to some consideration afterwards. The very many and varied forms of cutting and drilling instruments that have been used in the excavation of decay, are impossible to be described here, but for the benefit of those who have not seen many old forms, I have here a selection for illustration. The straight chisel-shaped excavator and scaler was the first form of instrument used, for cutting out a cavity. The drill was originally, and for many years, worked simply by hand rotation and without guards or any mechanism for the protection of the skin. Waite of London used these drills very extensively in 1820. Dr. Flagg's stock drill was the ordinary watchmaker's bow drill.

Spencer's drill was introduced in 1849 and was worked on the piston system so well known.

The greatest improvement as regards hand drilling instruments was in 1858, when Charles Merry introduced a drill which could be used in any position convenient to the

operator. This instrument is said to have given rise to the idea of dental engines, the first appearing in 1868 by G. F. Green and was very generally used in America.

The first engine offered to the profession at large was the Morrison which appeared in 1870-71 and really calls for little description, being almost the same as our present newest design.

Dr. Bonwill patented an engine soon afterwards the chief advantage of which was its capability of being converted into a small lathe, its use however, has not been very general. Elliot's suspension engine was patented in 1871. This engine was extensively used and indeed prized by the profession. White introduced one at about the same time with flexible arm. Like other dental instruments great and varied have been the improvements in engines, until now at the present time we have it worked by electric power. Up to the year 1800 the filling of teeth was an operation practised only by the most prominent dentists. Koecker writing in 1826 states that Englishmen in their works paid but slight scientific attention to this subject apparently deeming it not worth much consideration. This statement however seems to have been very forcibly contradicted by the fact that Joseph Fox writing in 1803 treats of the subject as a very important one. Some of the earliest filling materials known are lead, fusible metal and gold. A lead filling was inserted much the same as a non-cohesive gold filling at the present day. Fusible metal did not receive much professional sympathy and was strongly denounced by Koecker as a very destructive filling in its after effects. This opinion did not, however, prevent the very extensive use of the much abused material. It is stated by Harris that gold filling was introduced in the early part of the eighteenth century, but certainly to no great extent, since it was only spoken of by Fauchard in 1785. Dr.

Parmly states that the first gold filling he ever saw was in 1815 and this was inserted by Waite of London.

American dentists had great difficulties to contend with in obtaining the most suitable gold for filling, and made use of the Brazillian Johannes coin rolled out to the thinness required, but their rolled coins were then much thicker than our gold leaf of the present day, and required much condensation and management as a filling material. Dr. Cushman, it may be said, was the first to use a plugger anything like our present day instrument. It consisted of a straight piece of steel fixed into a handle and bent near the point at a right angle. Melted round the elbow was formed a mass of lead in a flat globular shape, below which the plugger point projected. This point being placed on the surface of a crown-filling, final and extreme condensation was effected by the patient biting forcibly down on the leaden ball. The method of crimping foil was introduced into France in 1851, but was not much sought after. Sponge gold found favour with the Profession in 1853. Dr. Arthur, of Baltimore, in 1855, discovered the cohesive power of gold by thoroughly annealing it in the spirit flame. This new innovation, however, did seem to meet with the approval it warranted, and it was not until some years after that it came to be generally adopted.

In early dentistry plastic fillings met with but little approbation, perhaps because the members of the profession were too dogmatic in their views, or perhaps men could not arrive at the real consistence of a plastic filling material in order to make the filling a lasting one. But the dental world did not lack inventive power at this period. France may without doubt lay claim to the introduction of silver paste, or as it was afterwards called amalgam, as a means of tooth preservation. This silver paste was introduced by M. Faveau of Paris, in 1826. Amalgam was a slight improvement on the

paste, and was experimented with in New York in 1833, by two Frenchmen of the name of Crawcour; these two men, I may mention, were the cause of the great amalgam war of that year, known I think to most of us. Amalgam, however, was not lost sight of, and after much investigation and experiment it was received with great favour by the profession. It has however, undergone slight changes since its first appearance, but nevertheless it has manifested its true qualities very fairly.

Gutta percha is so well known as a filling to us, that I will not waste time in discussing it. Suffice it to say that it came into use in 1847, and was well received. The first attempt to render gutta percha as near a permanent stopping as possible, was made by Hill in 1848, and was patented the following year.

Some of the methods of mechanical dentistry are so well known to most of us, that I shall deal briefly with this part of my paper. There are two qualities, says Harris, which are highly important that dental substitutes should possess. They should be durable in their nature, and in their appearance they should resemble the natural organs they replace. The earliest form of mechanical denture dates back as far as 300 B.C. These artificial teeth were made of sycamore or other hard wood, sometimes mounted on gold plate and ligatured by means of gold and silver wire to their natural neighbours as shown in the diagram before you. Ancient work of this description has been found, but as to detail or information little or none has been gained. Of the employment of human teeth as artificial substitutes, I think I need say but little, as they have not had much success except in pivoting. Next to human teeth came the teeth of neat cattle, these were used for a short time but the general vitiation of the mouth containing these teeth, was so marked that they were soon discarded.

now come to the use of elephant and hippopotamus ivory as a means of dental substitution. Teeth have been carved out from either of these substances, says Harris, from the earliest periods of this branch of our profession.

The forms of work are so well known to many of us that they only require to be illustrated by the pieces I am showing this evening. I may remark that this form of work continued long after mineral teeth came into use, but the great objection which has invariably been put forth is that perfect hygiene of the mouth cannot be maintained by the wearer of ivory artificial teeth.

Porcelain teeth were introduced into France in 1774 by Dr. Platon and I think from this period up to the present no profession or business has made such rapid and decided strides in general improvement and progress as the mechanical branch of the dental profession. These porcelain teeth were the exact shape of split beans and indeed had a most unsightly appearance.

The mineral or china teeth following upon these were very imperfect and had a most white, opaque and unnatural look. These imperfections of shape and colour continued until 1833 when great improvement began to be made by Stockton Alcock, Wildman and White, and a different class of teeth introduced.

Further improvements were not far behind in the shape of platinum pins introduced by White 1850, and now we have at the present day a tooth as closely resembling nature as possible. Ivory and bone were used as bases before and for a long time after metallic bases came into use. The chief objection to the ivory bases being the almost utter hopelessness of securing correct adaptation to the mouth, and the doubt as to the permanency of that fitting if obtained.

The date of metallic bases is uncertain, but probably the

first dentist who used gold as a base was Gardette, 1784. In the year 1851 came one of the greatest revolutions of the dental era, I mean the advent of vulcanite by Nelson Goodyear. It was believed by many that the new substance was a compound of horn, bone, and ivory, capable of being coloured, and resisting the action of heat, cold, and acids. As may be supposed, the dental world took up the idea, and put this very likely material into use. It was not, however, until the year 1855 that Chas. Goodyear obtained a patent in England for making a dental plate of hard rubber, in which teeth were secured. Gradual and steady improvement went on in this new idea, until we know at the present day it has been rendered very adaptable as a base.

Continuous Gum Work made its first appearance in France in 1820, and was brought forward by Delabarre.

Clasps and bands are the outgrowth of the old time ligature, and consisted of wires soldered on to the metal base, but were found to be objectionable to the patient, as they caused considerable irritation to the teeth they surrounded. Flat bands of gold soon took their place, their real utility being at first doubted; they met with but little opposition, however, and soon became firmly established. Were I to attempt to discuss the dates and primary methods of the earlier dentists, I might reasonably propose an extension of at least an hour, and I question very much whether it would be seconded. In conclusion therefore I must thank our worthy President, Mr. Phillips, also Messrs Capon, Alder, Newton, and McNois (of Messrs Ash and Sons) for their very great kindness and able assistance in affording me the opportunity of giving practical illustration to my paper this evening.

British Journal of Dental Science.

LONDON, JULY 15, 1895.

DENTISTRY IN HOLLAND.

We publish on another page a short report of the Dental Congress, recently held in Amsterdam, which is worthy of more than a passing notice. It would indeed be strange in a country with the historical, literary, and artistic associations with which The Hague, and Holland generally, are connected in the minds of Englishmen, that the practice of dental surgery should be neglected. The celebrated picture by Rembrandt, of "The Anatomical Lesson," at least brings to one's mind the reputation of the surgical teachers of the past, and the sturdy race (really our cousins, but probably of purer blood) which has made its mark in so many parts of the world, may be expected to keep pace with the needs of civilization. With a comparatively small population, however, the number of dentists in Holland has been necessarily limited, and organisation and combination have been wanting. A Society which has been in existence at Utrecht for some sixteen years, partakes more of the scientific character, and is somewhat analogous to our Odontological Society. Within the last year or two "The Holland Dental Association" has been inaugurated with the objects, so far as we can learn, of discussing educational matters, restricting illegal practice, and generally, of improving the status of the dentist.

Up to January of last year anyone could apply to be admitted to the first, or theoretical, examination which is required. This took place before the Medical Faculties of the four Universities in Holland, namely those in Amster-

dam, Leiden, Utrecht, and Groningen. Apparently this test was not very stringent, and the subjects not very comprehensive. This state of things probably accounted for the large number of failures which occurred in the final, or practical, examination. In one year, we believe, out of 80 candidates only 10 were successful. Now, however, under the new regulations, candidates must produce certificates from the Higher Grade Public Schools, with a curriculum of five years; this places them on the same footing as the lawyers, doctors, and civil engineers. The certificate from a Gymnasium denotes still higher qualifications, and includes Latin in addition to the English, French, and German acquired in the Higher Grade Schools. The Gymnasium is the one generally chosen by those who think of taking the M.D. degree, but it must be remembered that this is not the qualification for practice, but only an honorary addition obtained by a Thesis. The distinguishing title for medical men is that of "Arts." With respect to dental practice, it is forbidden to all those who have not passed the practical examination and registered their names with a Provincial Medical Inspector. The actual construction of artificial dentures is however permitted, but the dental mechanician must not perform any operation in the way of preparing the patient's mouth.

There are now therefore, three examinations to be passed by those who wish to become Dentists. First, a "preliminary" examination in general knowledge, which seems to be sufficiently severe, and, according to some views, to demand too much time. Secondly comes the "theoretical," which probably needs strengthening, and lastly, the "practical." This may be taken (after giving notice) as soon after the second as the candidate likes. The examinations go on throughout the year from October to July. There are no written papers, but the candidates are practically tested in Operative Dental Surgery, Diagnosis of Diseases of the Mouth, the treatment of Regulation cases, and Extraction. A fee of twenty-five guilders (about two guineas) is charged

and after two failures must be paid again. At present no opportunity exists for a student to obtain a full dental curriculum, but a scheme is under consideration to establish a school under the auspices of the Holland Dental Association. This new Body already numbers some forty members, and, provided that sound counsels prevail, should render a good account of itself. There are several lady dentists in Holland, who restrict their practice to ladies and children.

CHLOROFORM IN DENTAL OPERATIONS.—The Australasian correspondent of *The Lancet* says that within the last few months, there have been four cases of death under chloroform. Two of these occurred in the dentists' chair, and he points out that it will soon be established as the safer policy to regard all dental operations of any magnitude as a serious matter. The anæsthetic, then, should be given with all the precautions usual in surgical proceedings; the patient should be carefully prepared beforehand, the extraction done early in the day, and the patient should be in bed. All operations about the mouth and pharynx have their own special dangers, not only due to the operation itself, but also because of the great care with which the anæsthetic must be given. By following the rules mentioned above in all instances, a great deal of danger is avoided.

PYORRHOEA ALVEOLARIS.—Amongst the cases shown at a Post Graduate demonstration, by Mr. Jonathan Hutchinson, was one of a barmaid. The roots of all the nails of the left hand were the seat of chronic inflammation, and there were transverse ridges. It was quite possible to push a brush between the soft structures above the nail and the nail itself. The lecturer compared the effects with those of sycosis upon the hair, and also drew attention to an analogous affection known to dentists, namely, suppuration around the fangs of

teeth. It spread by means of its contagious matter from one tooth to another, and the only way to check it was to keep the mouth as far as possible thoroughly disinfected. A curious feature was that it occurred in perfectly healthy persons, and the patient mentioned above with eczema of the nails was quite free from any other skin affection. The disease secreted a contagious matter which spread from nail to nail. A similar class of case occurs in "pot-boy's eczema," and the contagious element is well displayed in such instances.

AN ARTIFICIAL NOSE.—Referring to a case described by Professor Arthur S. Underwood, in the *British Medical Journal*, Mr. Alfred Coleman has narrated a very similar one, but more severe. The patient had lost the whole of the nose as well as a portion of the face. She was wearing an artificial nose made of metal, and retained by spectacles, but the latter made the skin sore by pressure, and occasionally there was ulceration. Mr. Coleman constructed a model of the parts to which was adapted the cast of a nose. From this a vulcanite representative was obtained which fitted to the face accurately. The patient's twin sister had a nose decidedly *retroussee*, but she herself insisted upon having one of the Grecian type. A portrait painter kindly undertook the colouring, and succeeded admirably. There was, however, this defect, that when the lady flushed, as she frequently did, the nose looked very anæmic; when on the other hand she became pale, the nose looked almost suspicious.

ZEROSTOMIA.—One is so inclined to regard the insalivation of food as an important matter that it comes as a surprise to find the condition known as zerostomia, or dry mouth, in an otherwise healthy patient. Some seven or eight years ago Mr. Jonathan Hutchinson showed the first case recognised

in this country at the Neurological Society. All the others since observed have been women of about middle age. The symptoms generally come on rather suddenly, and then the whole of the glandular apparatus of the mouth and neighbouring parts, including the salivary glands, cease their functional activity. The patient first mentioned enjoyed good health and there was nothing to show that digestion was interfered with. In order to assist mastication she found it necessary to drink plenty of water, and for five years the condition remained practically the same. If anything, there was slight improvement, for the tongue instead of feeling absolutely dry is somewhat "sticky." The affection has a nervous origin.

DEATH FROM COCAINE POISONING.—Dr Danford Thomas recently held an inquest as to the death of a lady who had been under medical care for some years suffering from a disease which caused much pain. There had also been neuralgic pains in the gums for which she had occasionally used cocaine as a local anæsthetic. She was heard to cry out but with the exception of uttering the word "cocaine" was unable to speak and died in half an hour. The doctor said he had prescribed a solution of cocaine twelve months before. He gave directions that it was to be applied on cotton wool to the gums, but did not say what quantity was to be used. It was a disputed point as to what quantity taken internally would cause death, but a small dose would be practically harmless. He was called to see the deceased and found her in a state of collapse, and death, which was due to cocaine poisoning, took place shortly afterwards. The jury returned a verdict of Death by misadventure.

NITRITE OF AMYL IN SYNCOPE.—Dr. W. M. Killen, of Belfast, writes to the *British Medical Journal* to advise those who meet with threatened cardiac syncope during

operations to rely upon the immediate use of nitrite of amyl. Accompanying artificial respiration helps the entrance of amyl into the system. The writer considers that all other methods of treatment should be secondary, and they require more time and more assistance from others. He instances the case of a young woman with valvular heart disease to whom he reluctantly administered chloroform. The breathing suddenly became shallow, the face dusky, the pulse was a mere thread; it seemed to disappear for many seconds. The operation was stopped and nitrite of amyl used instantly. As soon as it entered the system by means of the still feeble respiration, the pulse rapidly returned and became strong again.

EAU AROMATIQUE.

			oz.
Tinct.	pyrethri	... ..	1½.
„	cinnam. ver.	... ..	4
„	caryoph	... ..	6
„	benzoin. simpl.	... ..	4
„	rad. angelicæ	... ..	4
„	sem. ambrettæ	... ..	4
„	coriand.	... ..	8
„	pimentæ	... ..	9
„	mosch. (24 gr. to 1 oz)	... ..	1
„	anisi esp.	... ..	1
Extract.	rosæ	... ..	4
Ess.	ambergris	... ..	1
„	Spt. menth. pip. (1 in 32)	... ..	1
„	„ chloroform	... ..	10
„	„ vini rect.	.. ..	30
Filter.			

LABEL.

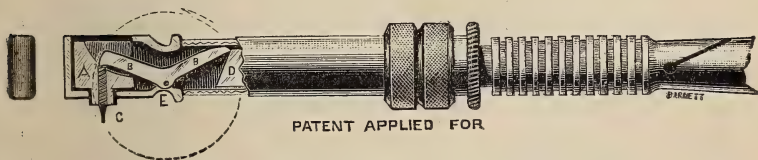
Eau aromatique, for preserving and cleansing the teeth and gums and sweetening the breath. Use $\frac{1}{2}$ teaspoonful in a wineglass of water.

Manipulative Miscellany,

It is requested that all new instruments or articles which it is wished to have described under this heading, be sent *for inspection* to the publisher not later than the 8th and 23rd of each month; they can be returned in a few days. Where, from the size or otherwise, this is impracticable, a clear and minute description will be sufficient; the sole object being to give practitioners a description of everything new, on its own merits and without any intention or wish to pit one against another. All makers, vendors, and inventors, are invited, with strict impartiality, to contribute towards this end.

A RIGHT-ANGLE MALLET.

Mr. E. S. Wright, of Greek Street, sends us a right angle mallet which seems to possess certain advantages. The blow is obtained and controlled in exactly the same way as in the Power engine mallet, but is transmitted to a right angle point, by Mr. Wright's modification. This fortunately does not interfere with keeping the end reduced to a smaller size than is found in some forms of right-angled mallets, and thus a better view is obtained of the gold in the cavity. We have found it works well in filling incisors from the lingual aspect with the aid of the mirror, and the designer claims that a good hammer-like action is obtained with an entire absence of any radial motion of the point.



- A, is a parallel plunger sliding in the outer case.
 B, a lever rocking on the centre E.
 C, a point screwed into the plunger A.
 mer by which the blow is given.

Abstracts of British & Foreign Journals.

PARTIAL ARTIFICIAL DENTURES A MENACE TO THE NATURAL TEETH.

By J. B. WILLMOTT, D.D.S., Toronto, Ont.

All dentists have observed the comparative immunity from caries of teeth naturally well separated from each other. We have all noticed that the anterior lower teeth, when free from tartar, are much less liable to develop caries than other teeth in the mouth, a condition explainable from the fact that in normal conditions every movement of the tongue forces the saliva over their approximal surfaces, thus preventing the condition of stasis under which fermentation flourishes.

If this reasoning be correct—and we have no doubt on that score—then it follows that every departure from the normal condition and relations of the teeth in the mouth that interferes to any extent with the free movement of what may be termed the interdental moisture is a menace to the permanence of the natural teeth, and a very important factor in the development of approximal surface caries. The degree to which partial artificial dentures thus endanger the remaining teeth will depend, of course, very much on the skill and intelligence with which this operation is performed. How are partial dentures on plastic bases usually constructed? Take, for illustration, the insertion of two lateral incisors on what is termed a band or spring-plate, a very common form. An accurate impression is taken of the remaining teeth and associate parts, and the vulcanite base-plate is constructed so as to cover from two-thirds to four-fifths of the palatal surfaces of the teeth as far back as the second molar. The denture fits beautifully into the interdental spaces; the artificial laterals completely fill the spaces and rest closely on the approximal surfaces of the cuspids and centrals, the base coming well upon the palatal surfaces of these teeth. The denture is put in position and pronounced a perfect fit. What have we accomplished besides replacing substitutes for two lost teeth? Simply this, that we have absolutely prevented any movement of the moisture in the interdental spaces so

long as the denture is in position. In many cases these are removed but once in twenty-four hours, when the teeth are brushed on rising in the morning. As experiment has determined that starch and sugar lodged between the teeth are, by the processes previously referred to, converted into acids in a very few hours, we can well understand why, in a few months the wearers of such dentures as those described should be shocked to find that what they regarded as good cuspids, centrals, bicuspid, and molars had developed extensive caries. To the initiated there is no occasion for surprise. If this had been the result deliberately aimed at, no more certain means to that end could have been devised.

While the class of partial dentures used as an illustration is possibly the worst sinner, inasmuch as in proportion to the number of teeth inserted it closes more interspaces and covers more palatal surfaces than other forms, the frequency with which lost bicuspid are replaced on dentures which cover the palatal surfaces of all the other upper teeth, preventing all movement of the fluids in the interspaces of the incisors and cuspids, accounts for the development of vast numbers of approximal cavities in the anterior teeth.

Where crowns or bridges are inserted in such a manner as to impede or prevent the movement of the fluids over the approximal surfaces of adjoining teeth, similar results are produced. What is the remedy? We admit, of course, that partial dentures must be inserted. The only question is, how can the danger to the remaining teeth be reduced to a minimum? Probably the best course to pursue would be to abandon entirely the use of plastic bases for partial dentures and substitute thin metallic bases, which will not close the dental interspaces or cover the palatal surfaces, at the same time exercising care that the tooth or teeth do not so closely fill the space as to prevent free wash over the exposed surfaces of the natural teeth, and depending for retention upon skilful clasping or on suction. With many patients the increased expense will make this method impossible. Even with plastic bases the evil may be enormously lessened. Where bicuspid or molars are replaced, what is known as a cut-off plate is an immense improvement on the ordinary forms.

Instead of reaching forward and resting on the palatal surfaces of the anterior teeth, it is cut from the cuspid on either side so as to expose in the median line from three-eighths to

five-eighths of an inch of the mucous covering of the palatal surface of the mouth. Posteriorly it is cut away from the remaining teeth so as to touch only a small portion of one tooth on either side of the space to be filled. It is extended across the palate and retained by suction. There are great advantages in this form in addition to the greater immunity from caries which it ensures. At no point in the mouth is a denture so much in the way as immediately behind the anterior teeth. This form leaves this portion uncovered. The special sense of taste is located in the tongue, and this function is much more perfectly performed when the tip of the tongue can be brought into contact with the mucous membrane of the anterior part of the palate. This is permitted by this form of plate. In cases where, of necessity, the plate must pass across the palatal surface of some natural teeth, as where a molar, first bicuspid, and central incisor are to be inserted, the intervening natural teeth being in position, the edge of the plate should be chamfered down till quite thin, so that the smallest portion of the palatal surface will be covered and the interspace left free. The backing of the artificial teeth should be bevelled away from the natural tooth so as to permit the free passage of fluids. In the insertion of Richmond crowns or Logan crowns care should be exercised that, especially at the central portion of the tooth, the artificial does not lie closely to the natural one.

One further suggestion in conclusion. If there is any truth in our contention, it is evident that the longer a partial denture remains in the mouth without removal the greater the danger of mischief. Our patients who are so unfortunate as to be obliged to wear these partial dentures should always be instructed as to the danger to the remaining teeth, and the conditions so explained that they can understand the necessity for the exercise of great care. They should be told that it is important that, several times during the day, the denture should be removed and the mouth rinsed in such a manner as to force the water over the approximal surfaces, washing out the interspaces, and especially should this be attended to immediately before retiring, so that the incipient fermentation of the particles of food remaining from the last meal may be broken up, and not be permitted, as it otherwise would, to go on to completion under the conditions of quiescence which exist during sleep. Under no circumstances should partial dentures be worn during the night.

The Dental Practitioner.

EARLY OPERATION IN CLEFT PALATE.

The advantages of early operations for cleft palate, in all cases in which operations are warranted at all, are very many. They may be successful in overcoming anatomical defects, when later in life they would be entirely useless. It is well known that the ordinary staphyloraphic operation after the patient has reached maturity is usually without good results, owing to the lack of tissue necessary completely to fill the cleft. The muscles which form the soft palate, from lack of use, have not developed with the rest of the body, but have atrophied, and the patient has at best the levator and tensor palati muscles of the infant, while the other organs are those of the adult. If the edges of the cleft are then approximated, they must of necessity put the undeveloped tissues upon a stretch, and draw them away from the posterior pharyngeal walls.

This is not the case when the operation is performed at a very early age, for there will then be a greater proportionate amount of tissue, and there will be less tension. The muscles will be brought into activity, and will commence to develop, and the condition after the child begins the attempt at speech will constantly improve. There is little doubt that there are many cases which, if operated upon at three days, might be successful, when if they are postponed for three months, they will be contraindicated.

There is another reason why early operations are desirable when they can be safely performed, and that is found in the fact that a cleft palate always prevents complete nourishment. The child cannot nurse, and must be artificially fed, and this tends to depress vitality, especially during the earliest periods of development. If the operation can be performed before the infant has lost some of the stock of vitality which it received from the mother during its intra-uterine life, it will be better prepared to resist the traumatic shock than it will be even a few weeks later. In a very short time after the operation it may begin to receive the benefits which it will bring to nutrition through the ability of the child to feed naturally. Of course this presupposes that the infant comes into the world with a fair stock of strength and vitality, and this is usually the case in instances of cleft palates.

Then there is the great advantage which a successful early

operation gives in enabling the child to commence its education properly. If it is obliged to wait until an obturator can be inserted, it is too late for correct speech ever to be completely restored. The muscles necessary to distinct enunciation will be for ever lacking, and no mechanical appliance can completely supply their place. Bad habits of speech will have been ineradicably acquired, and the apparatus will at best be what a wooden leg is to the man who has lost the natural limb—something which he must use with a limp if he uses it at all.

The Brophy operation for the radical closure of complete clefts of the hard palate, contemplates the reduction of the size of the arch by forcibly bringing the divided bones together, not by splitting, but by sutures passed through the whole maxilla, thus drawing the two halves together. All that is thus gained laterally may be used in extending the soft palate longitudinally, thus avoiding the necessity for any stretching when that in turn is sewed up. The tendinous portion of the tensor palati is not cut, and its function is preserved. But the success of the operation depends in a great measure upon its being performed early. Prof. Brophy has a record of a considerable number of complete successes, and what seems most strange, the reduction of the size of the upper arch is but temporary, for when development begins it proceeds until the arch has reached full normal size again, and when the teeth are erupted they occlude as naturally as if the arch had never been reduced. The writer of this has seen a number of cases which incontestibly establish this fact.

It would appear, then, that the line of advance should be in that of surgical procedures, and that it is from this that humanity has most to hope. Obturators and mechanical appliances will always be in demand, because the possibilities of surgery are from various causes limited.

The Dental Practitioner.

A USEFUL HINT.—Dr. G. H. Weagant says :—Occasionally we have a corundum wheel which will not fit a chuck—the hole being too large. An easy way to remedy this fault is to make a small band, larger than the size of the hole, place it over the end of the chuck and pour in some fusible alloy. Remove the band, place the chuck in the lathe, and with a chisel, turn down the alloy to fit the wheel.

ON MALIGNANT DISEASE OF THE PERI-DENTAL MEMBRANE.

By A. HOPEWELL SMITH, L.R.C.P. Lond.,
M.R.C.S., L.D.S. Eng.

During the course of some recent investigations in the subject of the patho-histology of the peridental membrane, I found among my specimens several marked examples of a new growth intimately associated with and springing from the fibrous periosteum of the teeth—a condition which seems to have escaped the attention of the writers of surgical and dental text-books. These periosteal tumours present on examination appearances which warrant more than a passing notice and afford a subject of great interest and importance to general and dental surgeons alike. The cases under consideration are not absolutely unique. For instance, Mr. Oakley Coles, at the Annual meeting of the British Dental Association held at Cambridge in 1885, mentioned that he had at a previous meeting of the Odontological Society of Great Britain, exhibited a specimen of round-celled sarcoma attached to a molar tooth, the microscopic examination of which had been made by Dr. Klein. As a result of the study of my morbid anatomy specimens, of which I possess more than half a dozen, I have been induced to place on record my observations on this particular and somewhat rare affection.

To those unfamiliar with the microscopical appearances of the peridental membrane a brief description of its histology is needful for a larger comprehension of the patho-histology of the disease. The alveolo-dental periosteum is a thin layer of connective tissue which surrounds the roots of teeth and occupies a position between them and their osseous sockets. It consists of bundles of large white connective tissue fibres arranged chiefly in a transverse direction, and is, in fact, "much like any ordinary fibrous membrane," being freely supplied with blood vessels and nerves. The cellular elements vary considerably, and include cementoblasts, osteoblasts, osteoclasts, and fibroblasts, together with cells and tissues of an "indifferent" nature* In addition there are occasionally

* Black : A Study of the Histology of the Periosteum and Peridental Membrane, p. 72. 1887.

found cementoclasts, calcospherite spherules, and the so-called "lymphatic spaces" described by Dr. G. V. Black. Of all these the fibrous tissues and fibroblasts predominate.

The chief points of interest in connection with these periodontal tumours are they that are found in connexion with the roots of sound teeth, and that their characteristics are those of round-celled (alveolar) sarcomata.

1. *Seats of occurrence*.—The growth is confined, as its *locus principii*, to the periosteum of the molar teeth, the maxillary being much oftener affected than the mandibular series. It is generally seen to rise from a point situated at the junction of the roots with the body of the tooth.

2. *Microscopical appearances*.—The tumours vary in size from that of a split pea to a small nut, and have a smooth, convoluted, rarely ragged surface. They are firm to the touch and are of a deep red colour. The teeth themselves are non-carious and exhibit in their hard parts no traces of disease except slight attrition of their cusps and (in some cases) absorption of the apices of the roots. They are markedly loose, and signs of chronic inflammation of the periosteum, accompanied by an accumulation of tartar, are often noticed.

3. The *etiology* of the disease is obscure ; but there seems to be a predisposition on the part of the growths to attack the fibrous membrane of the teeth of females about the period of the menopause. Long-continued and powerful friction, as shown by the wearing down of the cusps, is probably the exciting cause.

4. The *subjective symptoms* point chiefly to long-continued sharp pain, increased on pressure, the course of the disease lasting sometimes several months. The pain is excruciating at times, and such as to render necessary immediate extraction of the loosened organ.

5. *Objective symptoms*.—On examining the mouth, at first there is sometimes almost entire absence of swelling or of any usual inflammatory signs, and the tissues are not markedly indurated. There may be slight suppuration. If the disease is not far advanced diagnosis is only complete after removal of the tooth. Later, well-marked symptoms of malignancy appear.

6. *Microscopical appearances*.—The growths consist of masses of cells held together by a fine network of fibrous tissue which is very dense here or very loose there, and is in

some places apparently undergoing fibrification or chondrification. In the centre of the growth this network is scanty, but the intercellular tissue is conspicuous outside. Vessels are scanty in the centre and have extremely thin walls, they ramify among the cells. In the outer portion they are larger (but not dilated) and have normal walls. The cells themselves are for the most part rounded in shape and considerably larger than red blood-corpuscles. They contain one or more nuclei and are devoid of any definite cell wall. Great numbers of spindle cells exist. There is little hæmorrhage into the tissues, probably because of the small size of the growth, and because it has not advanced sufficiently to allow of large hæmorrhages to take place in its substance; but small extravasations of blood corpuscles are noticed here and there. Microscopically the growth is practically indistinguishable from granulation tissue, as has been pointed out by Mr. Knyvett Gordon; considered from a clinical aspect however, there can be no doubt as to its malignant nature.

The jaw was excised for malignant disease of the antrum by Mr. W. J. Pilcher of Boston, to whom I am indebted for the specimen. The photograph exhibits the first right maxillary molar *in situ*, with its peridental membrane greatly enlarged by the new growth. Infiltration of the surrounding parts has taken place, the gum, antral mucous membrane, and alveolar process being alike affected, and the latter partially absorbed. There is also absorption of the apical regions of both the labial roots. The patho-histology of this growth is identical with that of the isolated cases already mentioned, and from the evidence at hand it seems to be clear that the latter are only earlier stages of the former.

To sum up, it may be said that sarcomatous disease of the peridental membrane is not rare in its earlier forms, but that it is very seldom met with in an advanced condition; and that removal of the molar tooth fortunately cuts short its career if taken sufficiently early, but if it is allowed to continue it constitutes another starting-place for malignant disease of the maxillæ.

The Lancet.

ENGLISH TUBE CROWNS FOR BRIDGE-WORK.

By Dr. J. R. CALLAHAN, of Cincinnati.

We will admit, that modern bridge-work when properly constructed, is a blessing to suffering humanity ; but great as the blessing may be, we have to acknowledge that there are many weak points that even the expert is unable to overcome.

The man that will show us how to make the attachments to roots, that will not irritate the gums, that will not afford lodgment for food, that will not make a disgusting display of gold, that will not break or twist out of shape, that can be repaired without destroying the whole piece, and can be adjusted without destroying sound teeth ; that man will confer a great blessing upon our profession as well as upon thousands of people who carry about in their mouths those unsightly, broken and stinking abortions that are altogether too common in our midst.

It is our desire to call your attention to at least a partial correction of some of the defects in bridge-work as constructed in this country. The points in favour of the use of the English tube crowns in the construction of bridge-work that we wish to demonstrate to-day, are the concealment of metal, the introduction of crowns that are easiest to mount, least liable to fracture, that do not change colour during the course of construction of the bridge, and that are easiest to replace in case of accident.

We will give a few details for the construction of a simple piece of bridge-work extending from first superior molar to first superior bicuspid. The abutment teeth are ground to the proper shapes ; gold caps are then made to fit these stumps ; after caps are in place upon the roots, cut a hole in cap just over the root canal for the pin to pass through, being careful to have opening of such dimensions that the pin wire made for these teeth will fit in the cap snugly. Having selected a suitable crown fit it tightly to the cap : place the pin in the root and try on the crown ; if it be much out of line with the other teeth the fault must be put right by bending the pin or reaming the canal in the direction necessary. Try on the tooth once more ; when the proper position for the pin has been ascertained, remove cap and pin from the mouth and solder the pin in its place. Be careful to use smallest

amount of solder to get perfect attachments. The caps should now be put in position and the crowns placed loosely on the pins ; the crown to be suspended between molar and first bicuspid is now fitted to its place ; the neck or that portion of crown coming in contact with gum, should be ground to the right shape ; a very thin platinum plate should now be soldered to a piece of pin wire of proper length ; pass the wire pin through the tube in the crown and burnish the platinum plate to the V-shaped portion of crown just referred to ; now try the crowns and caps in the mouth, place a little sticky wax on the second bicuspid crown and platinum plate and force all the pieces to place in the mouth ; with a camel's hair brush place a very thin film of oil over the porcelain crowns, then remove the whole bridge from the mouth by means of plaster in the impression tray, trim the plaster from about the metal parts, then cover the pins and caps with impression compound, allow the compound time to become thoroughly cool, then cut away the plaster and remove the crowns ; the oil that was placed on the crowns will make this easy ; this will leave the pins sticking from the modelling compound. Now place a mixture of plaster and marble dust over these pins and after it is dry remove the modelling compound by means of dry heat ; this will put the metal parts in position to be soldered together and the porcelain crowns are out of the way, or in other words the piece will be soldered together without subjecting the porcelains to the heat that so often cracks and otherwise injures them ; place a piece of platino-iridium wire extending from molar to first bicuspid ; in the depressed platinum that was on the second bicuspid crown, flow enough solder over this to make a strong and smooth union ; cool and remove and finish ; place the metal on the roots in the mouth, adjust the crowns on the pins and see that everything fits to its place : then finish grinding the occluding surfaces ; then remove the whole piece from the mouth, roughen the pins slightly with a fine file, then boil all the parts in acid to remove every trace of oil or grease, dry with alcohol ; then we are ready to attach the crowns to the bridge. Have a small vessel filled with melted sulphur, with pliers grasp the bridge by the metal pins, the crowns being in position, warm the bridge piece slightly in the flame of bunsen burner, then with a warm wire carry the melted sulphur to the pin in the grinding surface of crown ;

the sulphur will run into every crack and crevice in the neighbourhood, and when cool the bridge will be ready to be cemented to the roots, and we will have a bridge piece that will show but a small line of gold at the gum border, that has been easy to construct.

The tube crowns are stronger than other kinds of porcelain teeth, for the reason that they are supported over their whole lower surface and the greatest strain an occlusion falls mostly in a vertical direction upon the crown and parallel to the line of the central pin; whereas in a flat tooth, the attachment being on one side only—the impact of the bite is more unevenly distributed, and not least of all they have not been exposed to the heat of soldering, which so often cracks and weakens the teeth in all kinds of metal plate work; the crowns under this method cannot change in colour. (1st), on account of their having been kept from the heat, and (2nd), because there is no metal backing to contend with; and if a crown should be broken, a new one can be put on in a few moments, without removing the bridge from the mouth.

Dental Register.

COMPRESSED AIR.

Regarding the use of compressed air in dentistry Dr. A. W. McCandless writes to the *Dental Digest* as follows:—

“Compressed air has lately come into use in the offices of a good many dentists, and after once becoming acquainted with its numerous virtues one would feel very much at a loss without it. It can be utilized by dentists very generally, as any town large enough to have water works or an electric light plant can furnish the necessary power. The water pressure is the less expensive of the two, as a motor is necessary to the equipment by electricity. For the former a beer pump is obtained and attached to the cold water supply and the waste. This may be placed in the laboratory under the sink out of the way and also be connected with a thirty or forty gallon hot water boiler, such as is used at a kitchen range. This makes a reservoir of sufficient capacity to contain enough air to be used for a considerable length of

time and in larger quantities than a pump would supply. The compressed air in combination with illuminating gas makes a beautiful flame for blow-pipe work, as the proportion of air and gas can be so nicely adjusted. Then as a chip blower at the chair it does away with the old-fashioned kind. The only objection heretofore was that the air being compressed and of a lower temperature than the atmosphere makes its use quite uncomfortable in a sensitive tooth, but I am very happy to be able to say that that objection has been done away with, as now I can heat the air to any temperature desired by electricity, and no matter if the air pressure is as high as sixty pounds it can be heated just as nicely as if the pressure were but five pounds. Besides this there are so many purposes for which this compressed air is useful that I advise everybody who can, to have it, and it is really an invaluable adjunct to the operating room and laboratory. I might add that to the same wire that furnishes electricity to heat the air I have an electric mouth lamp and a root dryer attached.

ELECTRICITY IN DENTISTRY.

Dr. W. F. Bradner says :—The advocates of electro-therapeutics cannot claim to have a panacea for all the ills of mortal man, still they feel that electricity is capable of doing much to alleviate the sufferings of humanity.

He quotes Dr. Marshall's experience with one of his own teeth as follows : "The right first superior bicuspid had been filled with gold at the age of twenty years, but, from poor manipulation had been refilled several times during the next fourteen years. Ten years ago the last of these fillings came out, leaving a large disto-approximal cavity and the pulp nearly exposed. The tooth was exceedingly sensitive to the slightest thermal changes, to acids or sweets; it was therefore plugged with Hill's stopping.

"Six years ago this filling was removed with the hope of introducing gold, but the tooth was in such a sensitive condition as to make it unwise to introduce a gold plug; oxy-phosphate cement was therefore substituted. During the

following night there were developed marked evidences of a congested condition of the pulp. The next morning the phosphate filling was removed and the cavity dressed with oil of cloves, and a solution of gutta percha in chloroform was flowed over the bottom of the cavity, which was refilled with oxyphosphate cement. The symptoms however, did not abate, but gradually increased in severity. I therefore determined to try the depleting effect of the positive galvanic current, and called upon my friend, Dr. Justin Hayes, of Chicago, with the request that this line of treatment might be thoroughly tried. The positive pole of the continuous galvanic current was applied to the tooth and the negative pole to the carotid triangle of the neck on the same side. The strength of the current was graduated to my ability to bear it without discomfort, and the poles were allowed to remain in position for about half an hour. At the end of ten minutes there was a marked improvement in the symptoms, and at the end of the half hour all discomfort in the tooth had disappeared. During the following night the tooth again became uneasy, but a second treatment of about twenty minutes the next morning completely relieved it, and from that time on it has caused me no annoyance. Three years ago the tooth was filled with gold (at a clinic by Dr. Roscoe F. Ludwig, at the International Medical Congress held at Washington, D.C.); the pulp is still vital, but is no more susceptible to irritating influences than that of any other tooth in my mouth."

METHOD OF FILLING ROOT-CANALS.

By Dr. JAMES H. DALY, Boston.

The application of an arsenious acid dressing that a pulp may be destroyed is an all important feature in the final result as to whether the filling of a root canal is to be successful or not.

If the merest particle of the acid is allowed to escape from the cavity and come in contact with gum tissue, then commences a destruction of it which is minor in importance to

what follows,—destruction of the septum of bone between the teeth. An inflammation is here established in the pericementum that is often thought to be caused by the pulp, and unnecessarily long and protracted treatment of the pulp-canal is the result. It is of the utmost importance that no part of the arsenical dressing come in contact with the tissue surrounding the tooth. A very severe case of necrosis came under my observation, caused by an unnecessarily large amount of acid being placed in the cavity in the first place, allowed to remain for a very long time, and the dressing so placed that there was a constant escape from the cavity of a small amount of the arsenious acid. The result was that a large area of bone was destroyed, necessitating removal. In destroying the dental pulp, a positive method, and one not followed by unpleasant features, is to administer gas and forcibly remove the pulp with a barbed broach. That patients are not always willing to have this done we are all aware.

In filling root-canals, I assume that we agree that the important feature is to thoroughly seal the apex of the root, not to force material through, neither to allow a small space to remain unfilled. A few operators, and I speak advisedly when I say a few, *can fill* tortuous canals, and have them hermetically sealed with gold-foil; but the majority are unable to successfully do so, nor is it necessary to thus exhaust both patient and operator. For that reason I find that a gold wire tapered at the end may be made to perfectly fill the end of the canal. With suitable sized gold wire for the case at hand, taper the wire and sharpen the extreme point, that it may easily be forced through the end of the canal,—not sufficiently to seriously wound the tissues but just enough to prick a little, the patient surely letting us know when that point is reached. Now mark on the gold wire broach the exact length of the canal, together with the portion of the wire through the end, and remove and file off the tiny sharpened portion; again insert in the canal and force to the end of the root, to see that there is no pain upon reinsertion; again remove and file into and almost through the wire one-sixteenth of an inch from the end: then again insert, and having forced to the end of the canal, twist the gold broach slightly, leaving the small portion that was nearly filed off at the end of the root, thus securely sealing it with a “royal” metal.

The remainder of the canal may be filled with any of the

root materials,—gutta-percha, oxychloride, or zinc phosphate as the operator prefers. It is true that it requires patience and care-taking to successfully cope with some of the flat canals found in superior bicuspid, also in mesial roots of lower molars, or large open foraminæ in the teeth of children; but if a royal metal is desired, it has seemed to me that this was an expeditious and comparatively easy way to obtain it.

International Dental Journal.

AN ENTERPRISING DENTIST.

A registered dentist practising in North London (Mr. J. S. Armitage, 1, Colva-street, Dartmouth park) was on May 23rd mulcted in two penalties of £5 each at the Bloomsbury County Court, at the instance of the Pharmaceutical Society, for the sale of poisons, information having been given to the Pharmaceutical Society by the London and Counties Medical Protection Society.

The Lancet.

OXYPHOSPHATE OF COPPER.

Dr. W. V. B. Ames, Chicago, considers this invaluable in what may be called "desperate cases." It is compounded by mixing black oxide of copper, cupric oxide, with a solution of phosphoric acid. A phosphate of copper *per se* is formed which is held in solution in an excess of phosphoric acid. The cement is used in a plastic state and penetrates the tubuli of the dentine exerting a positively embalming effect. It is insoluble in the fluids of the mouth after crystallization. It is contra-indicated for crown setting from its caustic nature, but it is valuable for filling purposes where conditions admit. It cannot be used indiscriminately as it might cause an occasional devitalized and mummified pulp. Its permeation of the tubuli makes its use advantageous when it is impractical to thoroughly remove all of the semi-disorganised dentine. It arrests further destruction of that tissue and corrects the sensitiveness which renders further excavation impossible.

Reports of Societies.

MANCHESTER ODONTOLOGICAL SOCIETY.

The ordinary monthly meeting of the above society was held on Tuesday evening, April 2nd, 1895, in the Grand Hotel, Aytoun Street, Manchester, the president, Mr. William Dougan in the chair.

CASUAL COMMUNICATION.

The PRESIDENT, (Mr. Dougan) brought before the members a sample of Dr. Schreier's preparation for cleansing pulp canals "Kalium Natrium." It was intended to be used in those cases where the nerve was in a state of putrescence, and was to be introduced into the canal in minute particles by means of a nerve extractor, or other suitable instrument. Its affinity for oxygen led to its combination with the moisture in the canal with the consequent evolution of heat, and the formation of a soapy mass easily removed from the canal. The preparation required to be used with great care, as it took fire instantly in contact with the saliva.

Mr. A. B. Wolfenden read a paper on "Nitrous Oxide and Oxygen" which is published on page 625.

DISCUSSION.

The President invited the members to discuss not only the paper read that evening by Mr. Wolfenden, but the demonstration given at the previous meeting on "Nitrous Oxide Gas and Oxygen" and also that on "Gold Crowns" by Mr. Geo. O. Whittaker.

Mr. SIMMS said that he had been using the mixture of the two gases for a little time, and so far his experience had been satisfactory. Englishmen had taken no mean part in introducing and perfecting the various apparati for administering N_2O , and this latest introduction of the "mixture" placed them under a great obligation to Dr. Hewitt. While the use of N_2O alone was comparatively safe, they all knew it was not absolutely so, and while the number of reputed deaths from gas was small, there had probably been many cases where dangerous conditions had been encountered and the worst.

results averted only by skill and ready resource. It was their duty to receive and adopt any method which gave reasonable hope of making the administration of N_2O more safe. As a Society they were greatly indebted to Mr. Wolfenden for his very successful demonstration and for the paper read to them that evening. At the former meeting they also had the advantage of a demonstration of Gold Crowning by Mr. Whittaker, a piece of work which was admirably executed. In this case Mr. Whittaker had challenged their criticism by the insertion of a "box crown" with porcelain front for the replacing of the upper centrals and laterals. In view of the strain on the upper teeth, by the forward movement of the lower jaw, it was a question with him (Mr. Simms) how far it was wise to dispense with the use of a pin in the root of the tooth. Time alone could tell whether this form of crown for front teeth was likely to be sufficiently lasting to encourage them to use it in such cases.

Mr. MURPHY said that the latest form of apparatus for administering N_2O and O was a great advance on that first used. He would, however, like to know whether the mixture could be given in connection with a gas holder. Very few dentists now made their own gas, but he always made it a practice to do so, and he did not get any discoloration in the face except in a few instances where people possessed florid complexions. Until he could see that really there was some improvement in the administration of the two gases he certainly should adhere to his old friend nitrous oxide. He had used gas for 25 years and to his mind the danger was infinitesimal indeed. He agreed also that Mr. Whittaker's demonstration was admirable. There was however, one disadvantage, and that was that a good deal of the surface of the lower tooth had to be ground in order to adjust the bite. This was not a sort of practice exactly relished by patients.

Mr. HOUGHTON said that in the paper just read he thought there was no mention of the method of combining air with N_2O . He had tried for the last six or eight months the method, and he got exactly the same results as Mr. Wolfenden would do with his apparatus.

Mr. PETER HEADRIDGE stated that the weakest point in Mr. Whittaker's demonstrations was the fact of having the central and lateral teeth supported on one root. He preferred also to cap the entire root, and not to rely upon the

joint made by the fitting of the porcelain tooth to the gold, as in Mr. Whittaker's demonstration.

The PRESIDENT (Mr. Dougan) said that up to the present he had not been struck with the improvement of the mixture of gases over N_2O alone. It appeared, however, to have a slight advantage in increasing the time of anæsthesia, and perhaps for young children it would be an advantage over gas alone.

Mr. WOLFENDEN replying on the discussion of his paper, mentioned that as to the assertion that the valves were complicated, he might tell them that up to the present he had had no difficulty in the using of them. He rather advocated that the gases should not be combined in one holder, and the advice of Dr. Hewitt should be taken on this point, who stated that the gases should always be fresh.

Mr. WHITTAKER in answer to the criticisms on his demonstration, remarked that he had treated 150 crowns during the last eighteen months with his method. The fixing of teeth according to the method he had demonstrated could be accomplished without any grinding of antagonizing teeth at the edges, but in some cases, no matter what the method of crowning adopted, it was advisable to grind an antagonizing tooth, and little, if any, harm was done by the practice. He would never join two or three teeth together unless it was a matter of absolute necessity, and he objected to the bridging over of two or three roots. A pin, by this method could not well be used, and he thought it unnecessary. In his scheme there was every protection and guarantee that the cement would not easily wash away in the mouth. He maintained that the cement underneath the porcelain was as safe as if protected with a metal cap. The method was a stronger and more solid one than fitting the teeth on to the gold.

COCAINE A POISON.—The evidence to prove cocaine a poison is now so ample that no excuse will avail to exonerate the doctor who, not heeding the lesson taught by the gruesome record, fails to use it with the care its toxic energy demands. It is a drug peerless for good in certain conditions, but its power for ill must never be lost sight of, if one would conserve the best interest of those on whom it may seem wise to use it.—J. B. Mattison, M.D., in *American Medico-Surgical Bulletin*.

Dental News.

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

PASS LIST.

The following gentlemen, having passed the necessary examinations, were admitted Licentiates in Dental Surgery.

Atkinson, Frederick George, Charing-cross Hospital and the Dental Hospital of London.

Bateman, Julius Barthroppe, Charing-cross Hospital and the Dental Hospital of London.

Bates, George Llewellyn, Charing-cross Hospital and the Dental Hospital of London.

Bellaby, Francis Montagu Fitz-Walter, Owens College Dental Department and Victoria Dental Hospital, Manchester.

Bennett, John Henry, Charing-cross Hospital and the Dental Hospital of London.

Bettridge, Albert Edward, Charing-cross Hospital and the Dental Hospital of London.

Booth, John Henry, Owens College Dental Department and Victoria Dental Hospital, Manchester.

Bowtell, Stewart Ross, Charing-cross Hospital and the Dental Hospital of London.

Bowden, George Henry, Guy's Hospital.

Burton, Percy, Middlesex Hospital and the Dental Hospital of London.

Cahill, Alfred, Guy's Hospital.

Cannell, Edward Kemp, Charing-cross Hospital and the Dental Hospital of London.

Cardwell, Ernest Edward, Charing-cross Hospital and the Dental Hospital of London.

Collett, Albert James, Guy's Hospital.

Cook, Horace, Guy's Hospital.

Dalton, John Willie, Charing-cross Hospital and the Dental Hospital of London.

Day, Ernest Frank, Charing-cross Hospital and the Dental Hospital of London.

Gosschalk, Meyer, Charing-cross Hospital and the Dental Hospital of London.

Jenkin, Thomas George, Middlesex Hospital and the National Dental Hospital.

- Johnston, William, Charing-cross Hospital and the Dental Hospital of London.
- Keall, Clarence Albert Harry, Guy's Hospital.
- Little, Frederick, University College and Dental Department, Royal Infirmary, Bristol.
- Lean, Norman Henry, Middlesex Hospital and the Dental Hospital of London.
- Mackley, Herbert Edwin, Middlesex Hospital and the Dental Hospital of London.
- Masters, Edwin Clarence Platt, Middlesex Hospital and the National Dental Hospital.
- Mathews, John Hilditch, Charing-cross Hospital and the Dental Hospital of London.
- Morgan, Edwin, Guy's Hospital.
- Mountford, Edwin Henry, Charing-cross Hospital and the Dental Hospital of London.
- Muhlenkamp, Fritz Heinrich Arthur, Guy's Hospital.
- Nowell, Walter Salmon, Middlesex Hospital and the Dental Hospital of London.
- Pearse, Cecil Gilbert, Charing-cross Hospital and the Dental Hospital of London.
- Pedler, William Frederick, M.R.C.S. Eng., St. Bartholomew's Hospital and the National Dental Hospital.
- Price, George Herbert, Charing-cross Hospital and the Dental Hospital of London.
- Quinby, Arthur Henry, Liverpool Dental Hospital and Liverpool Royal Infirmary School of Medicine Dental Department.
- Shields, John Lewis, Liverpool Dental Hospital and Liverpool Royal Infirmary School of Medicine Dental Department.
- Stevens, David Sydney, Guy's Hospital.
- Strand, Alick Condell, M.R.C.S. Eng., Middlesex Hospital and the Dental Hospital of London.
- Sugden, Thomas Edward, Middlesex Hospital and the National Dental Hospital.
- Taylor, Harry Percy, Guy's Hospital.
- Theakstone, Joseph, Owens College Dental Department and Victoria Hospital, Manchester.
- Tice, Henry William, Middlesex Hospital and the National Dental Hospital.
- Tindal, John, Charing-cross Hospital and the Dental Hospital of London.
- Trick, Walter Henry, Guy's Hospital.
- Wallace, James Sims, B. Sc., M.D., C.M. Edin., Glasgow Dental Hospital, the Dental Hospital of London, and the National Dental Hospital.
- Wallis, Herbert, Guy's Hospital.
- Williams, Charles Henry Hughes, Charing-cross Hospital and the Dental Hospital of London.

Fifteen gentlemen were referred back to their professional

studies. All candidates referred at this examination will be required to produce, before admission to re-examination, a certificate of three months additional study at a general hospital and a special dental hospital, the precise attendances required at each hospital being left to the discretion of the respective hospital authorities.

A DENTAL MEETING IN HOLLAND.

A most successful Congress of the dentists of the Netherlands took place last month in Amsterdam. The meetings were held on Friday and Saturday the 28th and 29th ult., in suitable rooms provided by the University authorities, and constituted an historic event. For the first time Dutch dentists met together in a national assembly, at the invitation of the Holland Dental Society, and no doubt benefitted not only by discussing professional topics, but also by making better acquaintance with one another. A strong Committee of organization had been formed to make the necessary arrangements, amongst them being Dr. John E. Grevers, who has done much for the advancement of the dental profession in Holland. The Sessions were presided over by Mr. E. Stark, who in addition to his standing as a *tandmeester* (dentist), is well known for his artistic capabilities, particularly as an etcher. Dr. Dentz, of Utrecht, who is the President of the older professional Association, also attended the meetings, and amongst those from foreign countries were Herbst and his son from Bremen, Brandt from Berlin, Cunningham (Cambridge), and Spokes (London). The demonstrations included gold filling by the rotation method, crown and bridge work, glass fillings, inlays, obturators and immediate prosthesis, continuous gum, and there was also an hypnotic exhibition for those interested in the subject. The Chairman read a paper on professional education, and discussions also followed communications upon Immediate Regulation and the question of School Children's teeth, illustrated with the optical lantern. At the close of the first day's work, there was a dinner at the American Hotel, followed by a drive into the country, and on the following evening a more important function at the Doolen Hotel. At this dinner many ladies

were present, and much enthusiasm was shown in the speeches. The *menu* card was an etching by the Chairman, and will doubtless be preserved by many as a delightful *souvenir* of a memorable evening. In addition to these social festivities, the foreign guests were taken for a sail up the Zuyder Zee to the Isle of Marken by Dr. Grevers

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

At the last meeting of the Council the following was amongst the business transacted:—A report dated May 17th from the President and Vice-Presidents on section 16 of the by-laws was approved and adopted; the Secretary of State had suggested that the first three clauses of this section should be condensed into a single paragraph as follows: 1. If any Fellow or Member of the College shall after due inquiry be judged by the Council to have been guilty of disgraceful conduct in any professional respect, he shall be liable to removal by resolution of the Council from being a Fellow and Member or Member of the College.

The Council abrogated and annulled the old by-laws and ordained the new by-laws and signed them. It was moved and adopted that section 16 of the by-laws as approved by the Home Secretary be read to the meeting of Fellows on the 4th prox., and that, inasmuch as the by-laws have now been sanctioned, the correspondence of the Society of Members and of the Council with the Home Secretary on the subject be not now reported to the meeting.

A letter was read from Mr. Charles S. Tomes resigning his appointment as a member of the Board of Examiners in Dental Surgery. The resignation was accepted, and the President stated that the vacancy thus occasioned, and also the vacancy caused by the expiration of the period of office of Mr. Ashley Wm. Barrett would be filled at the quarterly meeting of the Council on July 11th. A letter of the 10th inst. was read from Mr. Thomas Bryant, reporting the proceedings of the General Medical Council. The thanks of the Council were accorded to Mr. Bryant for his service as representative of the College on the General Medical Council.

Dental Hospital Reports.

WORK DONE at the Victoria Dental Hospital of Manchester,
during the month of June, 1895.

Number of Patients attended	625
Number of Extractions	429
Number of Extractions under Anæsthetics	116
Gold Stoppings	29
Other Stoppings	74
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	196
Crowns	2
Irregularities	13
Total	859

J. BUTTERWORTH, *House Dental Surgeon.*

APPOINTMENTS.

J. W. Pare, M.D. Edin.; L.D.S. Eng., appointed Lecturer on Dental Anatomy and Physiology at the National Dental College.

W. H. Wheatley, L.D.S. Eng., appointed Assistant Dental Surgeon to the National Dental Hospital, Great Portland Street, W.

Francis Mark Farmer re-appointed House Surgeon, National Dental Hospital.

W. F. Pedler, M.R.C.S., L.D.S. Eng., appointed House Surgeon, National Dental Hospital.

British Journal of Dental Science.

No. 661. LONDON, AUGUST 1, 1895. Vol. XXXVIII.

THE TEETH AND CIVILIZATION.

By F. J. ALLEN, M.A., M.D. Cantab.,
Professor of Physiology, Mason College, Birmingham.

Last summer a correspondence occurred in the pages of "*Nature*," on the cause of the degeneration of the teeth in civilization. The usual explanations were offered, without much advancing the matter, but one of the chief causes seemed to be overlooked by all the correspondents, namely *the opposition of the medical art to natural selection*.

A letter which I offered, pressing the importance of this cause, was not accepted. But as my views have the support of several persons well qualified to judge in the matter, I beg to offer the following short statement of them for publication, and shall be glad to hear the opinions of the readers of the *British Journal of Dental Science*.

We have learned to cure or palliate so many diseases and defects, that numbers of persons who in former times would have died of such disorders, are now saved; it may be to endure life-long evil consequences, to propagate an unhealthy offspring, and to meet death in one of its more terrible forms. In this way we increase the prevalence of bodily defects and chronic ailments, and raise the percentage of deaths from cancer and diseases of the nervous system. One of the

results of this system of palliation is a gradual degeneration of the teeth, produced through the action of natural processes which I will endeavour to explain.

A constitutional defect, if left to the ordinary course of nature, tends to become extinguished by the failure of the unfit. But if the defect be alleviated or palliated, the result is not to diminish, but to increase its prevalence; for in its disguised form it does not obtrude itself as a factor in natural selection.

Now imperfection in the quality of the teeth, whatever its exciting cause, may reasonably be regarded as an index of a constitutional defect, which would be more or less hereditary, but would nevertheless tend to disappear in the course of natural selection. In a natural state of man, those individuals whose teeth were defective would be eliminated through the working of several causes, such as the inability to eat rough foods, dyspepsia, the depressing effects of tooth-ache, infection of the lungs by the septic organisms of the mouth, and sexual repulsion. The last mentioned, but by no means least important cause, would be due to disfigurement, foul breath, ill-health, and bad temper.

But we have changed all this. The invention of dental extraction forceps (within the present century) has immensely simplified the removal of offending teeth; carious teeth are stopped, deformities of the mouth are rectified by mechanical appliances; and deficiencies are supplied by artificial teeth. In fact millions of persons are rendered comfortable and marriageable, who would by nature have been miserable and repulsive, and thus each new generation becomes more infected with the germ-plasm of edentulous individuals who should have died without offspring. Anyone who wishes to realize the effect of this process on the coming race, should imagine his whole acquaintance as they would have been if the dentist's aid had been denied them, and he will see that in

that condition few of them would be eligible for marriage, though the offspring of those few would tend to inherit teeth of better quality than is possible under present conditions.

But dental surgery is not alone responsible. The teeth are developed in childhood, and a sickly childhood engenders an unsound set of teeth. Under natural circumstances the ordinary infantile diseases have a high mortality, and those infants whose tooth-germs have been spoilt by illness do not survive to suffer from their unsound development. But medical art grows constantly more successful in pulling children through scathing diseases, and launching them in life with blemishes of which an unsound denture is only one of the more conspicuous.

Again, many who would die for want of that natural nourishment which their wealthy mothers cannot supply, are kept alive by unnatural feeding, so that they not only inherit the weakness of their parents, but also have it aggravated by unsuitable food. The case is worse still with those who would never have been born except for the advanced medical, surgical, or obstetrical assistance which their parents received.

It is probably best for a race, physically, mentally, and perhaps morally, that its defective members should die before maturity,—that the infant mortality should be high; and while we boast of our skill in defeating death, it may be worth while to consider whether we are at the same time defeating some of the main objects of life.

RATIONALISM IN MEDICINE.—Dr. Alfred H. Carter says that the whole fabric of rational medicine rests upon a tripod, of which the one division is clinical observation and study of the signs and symptoms of disease; the second is the study of the seats and processes of disease; and the third is the study of remedies employed for the relief and cure of disease.

ORAL SURGERY.

By EDMUND W. ROUGHTON, B.S., M.D. (Lond.), F.R.C.S.
Eng.

FRACTURE OF THE MANDIBLE.

Causes. Fracture of the mandible is nearly always the result of considerable direct violence, such as the kick of a horse, a fall from a height, a blow from a fist, etc. Small pieces of the alveolus are often unavoidably broken in extracting teeth, but a complete fracture may occur during extraction by unskilled persons. It is said that fracture has resulted from muscular action, but such an occurrence must be extremely rare.

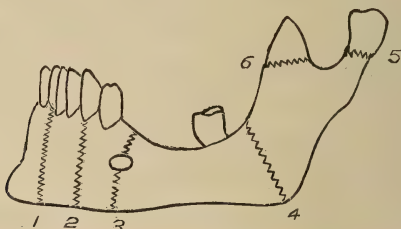


Fig. 1.—VARIOUS SITES OF FRACTURE.

1. At Symphysis. 2. Through Socket of Canine Tooth. 3. Through mental Foramen.
4. At the Angle. 5. Through neck of Condyle.
6. Through Coronoid process.

Varieties. Most fractures of the mandible are compound, because the muco-periosteum covering the bone is torn, thus admitting air from the mouth; when the fracture occurs in a part of the bone not in direct relation with the buccal cavity it is usually simple, unless it results from a penetrating wound or gunshot injury. The fracture may be single, multiple or comminuted.

Situation. The line of fracture may pass through the socket of the canine tooth, the mental foramen, the symphysis,

the angle, the ramus, the neck of the condyle or the coronoid process. The commonest situations are the socket of the canine tooth and the mental foramen. (Fig 1)

Symptoms. The symptoms of fracture of the mandible are pain, deformity, preternatural mobility, crepitus, loss of function, bleeding from the gums and dribbling of saliva. The pain is usually severe, more so than in most fractures ; its severity is due partly to the laceration of the gum and partly to injury to the mandibular nerve ; it is increased on masticating, swallowing or speaking, and causes the patient to support the injured part with his hands.

The deformity is only noticeable on looking inside the mouth ; it is due to displacement of the fragments. The smaller or posterior fragment is usually displaced outwards and a little forwards overlapping the larger or anterior fragment ; the displacement is due partly to the direction of the line of fracture which runs as a rule from the inner plate forwards and outwards to the outer plate. When the body of the jaw is fractured on both sides, the displacement is more marked, the loose central fragment being drawn downwards and backwards by the muscles passing to the hyoid bone. When the fracture is in the ramus there is very little displacement and it does not of course affect the regularity of the teeth. In fracture of the neck of the condyle, the latter is drawn forwards by the external pterygoid muscle and can be felt by the finger introduced into the mouth ; the chin is slightly tilted towards the injured side, (the reverse occurs in unilateral dislocation).

Preternatural mobility is more apparent the nearer the fracture is to the middle line ; it can be both seen and felt ; it is most marked when the fracture is double.

Crepitus can be detected when the fragments are moved on each other, or by placing the hand over the injured part while the patient opens and closes the mouth. It is of most value

as a symptom when the fracture is situated in the ramus or the neck of the condyle, because in these cases the other symptoms are more obscure.

Loss of function is evidenced by inability to masticate, and by impaired distinction of speech.

Complications. Fracture of the mandible is usually a comparatively trifling injury and is soon repaired, but it may be complicated by the following conditions.

(a) *Hæmorrhage.* This is usually slight and derived from the injured gum, but severe bleeding (both primary and secondary) has been known to occur from injury to the inferior dental artery.

(b) *Wounds of the face* are rare except in gunshot injuries.

(c) *Dislocation of the mandible* is extremely rare in cases of fracture.

(d) *Injury to the teeth.* One or more teeth in the vicinity of the fracture are occasionally broken or a tooth may be dislocated from its socket and interposed between the broken ends of the bone interfering with the process of union.

(e) *Damage to the mandibular nerve* may occur at the time of the accident, or subsequently from the pressure of callus, causing anæsthesia or neuralgia in the region supplied by the nerve.

(f) *Injury to the base of the skull.* The condyle has been known to be driven through the glenoid cavity and inflict fatal injury to the brain.

(g) *Necrosis* may result from complete separation of a fragment from its vascular connections at the time of the injury or subsequently as the result of suppuration.

(h) *Salivary fistula* may result from imperfect healing of an abscess which has burst upon the surface of the cheek.

(i) *Vicious union*, i.e., union with deformity, may occur when the fragments have not been kept in proper apposition,

especially in multiple fractures, or where there has been loss of bone from necrosis.

(j) *Non-union* may be due to want of apposition through lack of treatment, or through the interposition of a loose or necrosed fragment or a dislocated tooth.

(k) *False joint*. In this condition the ununited fragments become rounded off at the ends and held together by a sort of fibrous capsule lined by a smooth membrane which secretes a



Fig. 2.—THE FOUR-TAILED BANDAGE APPLIED.

kind of synovial fluid. In Esmarch's operation for closure of the jaws, the surgeon aims at producing this condition.

TREATMENT.

The following are the methods most frequently used.

(1) *The four-tailed Bandage*. A piece of bandage a yard long and 4 inches wide, with a hole 2 inches long in the middle of it, and with the ends split to within four inches of the hole, is applied so that the point of the chin is received into the hole. (Fig 2) The hole should be about an inch nearer the

upper than the lower edge of the bandage, so that the latter may lift the jaw rather than tend to drag it backwards. The two lower tails are tied over the top of the head, and the two upper ones behind the occiput, the two portions being subsequently knotted together to prevent their slipping. If the upper tails are tied behind the nape of the neck (as recommended by some surgeons) they have a tendency to draw the anterior fragment backwards.

Some surgeons supplement the four-tailed bandage with a moulded gutta-percha splint. (Fig 3). In most cases it is

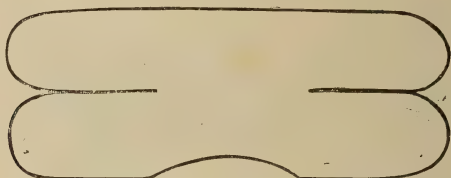


Fig. 3.—GUTTA PERCHA SPLINT BEFORE MOULDING.

unnecessary and adds to the discomfort of the patient by retaining the perspiration, by becoming soaked with saliva and by pressing upon the soft tissues of the chin. If used it should be perforated with small holes and lined with chamois leather or lint, and the parts dusted over with an absorbent antiseptic powder.

The objections to the use of the four-tailed bandage are when there is much displacement, especially in oblique fractures, the bandage does not remedy it and the jaws being kept in apposition, mastication is impossible and the patient is limited to fluid nourishment.

(2). *The Hammond Splint.* This consists of a wire frame which is accurately fitted and fixed to the teeth. The splint is fitted in the first instance on a model of the jaw. To obtain the model, the fracture is fixed temporarily by a silk ligature passed round two teeth on each side of the fracture, and an impression of both upper and lower jaws taken in wax. When

the models have been cast, the lower one must be sawn through at the line of fracture, (Fig 4), and the pieces fixed together so that the upper and lower teeth articulate correctly. In

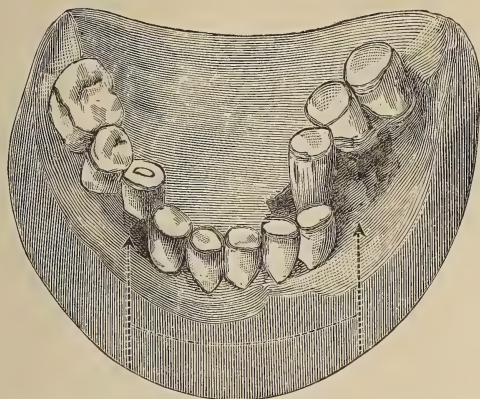


Fig. 4.—MODEL OF FRACTURE OF MANDIBLE.

The dotted lines show the position of the saw-cuts necessary to remedy the displacement. (Newland-Pedley.)

this way is obtained a model of the same size and shape as the jaw before it was broken. To this model a frame of soft iron wire is accurately moulded, the ends being soldered

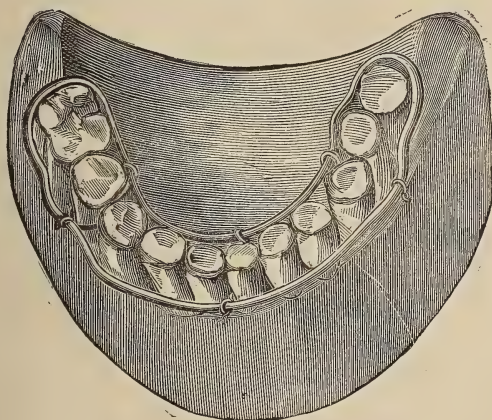


Fig. 5.—HAMMOND SPLINT APPLIED ON THE CORRECTED MODEL. (Newland-Pedley.)

together (Fig 5). The splint thus constructed is next slipped over the patient's teeth (which should be free from tartar) and fixed in position by means of a number of pieces of iron binding wire about five inches long and pointed at the ends to facilitate their passage between the teeth. The first wire is passed over the outer bar of the splint, between the first and second molar teeth of the left side and below the inner bar; it is then bent round being made to return over the inner bar, between the first molar and second bicuspid and under the outer limb; the two ends are then loosely twisted together. (Fig 6). The same process is repeated on the right side of the mouth. The wiring is repeated on alternate teeth, until

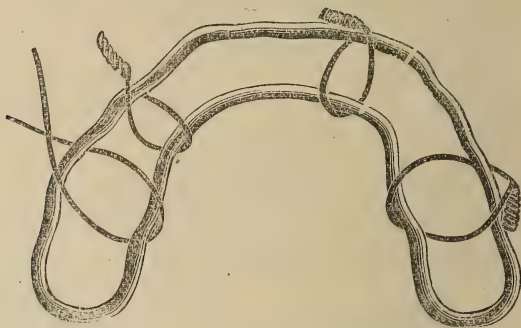


Fig. 6.—HAMMOND'S SPLINT.

Showing the method of passing the Binding Wires.

the splint has a firm hold; it is not necessary to wire every tooth, and it is inadvisable to wire those in the immediate vicinity of the fracture. When all the wires have been passed the ends are twisted up, cut short, and tucked away under the outer bar of the splint. After a few days they will probably want tightening up a little more. The advantages of the Hammond splint are (a) the fracture is brought into accurate apposition so that the "bite" is restored. (b) It is very firmly fixed. (c) Mastication and speech are very

little interfered with. (d) The mouth can be kept clean. (e) The apparatus is out of sight. Unfortunately its applicability is limited to those cases in which there are a sufficient number of firm sound teeth on each side of the fracture to enable it to obtain a firm hold.

(3). *The Hayward (or Kingsley) Splint.* This consists of a metal or vulcanite cap which fits over the teeth. In the sides of the cap are fixed two wires an eighth of an inch thick; the wires are curved so that, when the apparatus is applied, they emerge from the angles of the mouth and lie over the cheek. (Fig 7). The splint is fixed by means of a bandage passing under the jaw between the two wires. Its chief disadvantage is that the projecting wires prevent the patient from sleeping on the side.

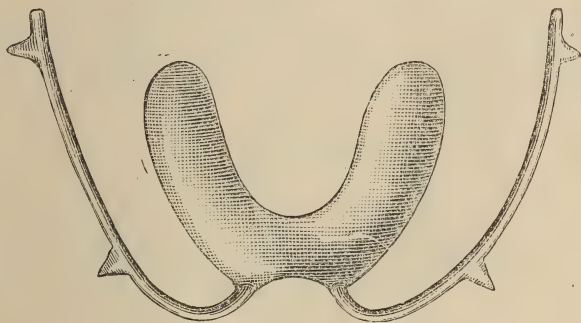


Fig. 7.—HAYWARD'S SPLINT.

(4). *The Gunning Splint.* This is a vulcanite splint which has depressions to receive the teeth of both the upper and the lower jaws. (Fig 8). When applied, the jaws are bound together by a four-tailed bandage. The disadvantages of this splint are (a) suspension of mastication, (b) dribbling of saliva (c) fatigue from propping the jaws open (d) difficulty in keeping the mouth clean.

(5) *Ackland's Splint.* This consists of a plated metal

horse-shoe shaped piece which rests on the lower teeth, and a similar one which is applied below the chin. These are fas-

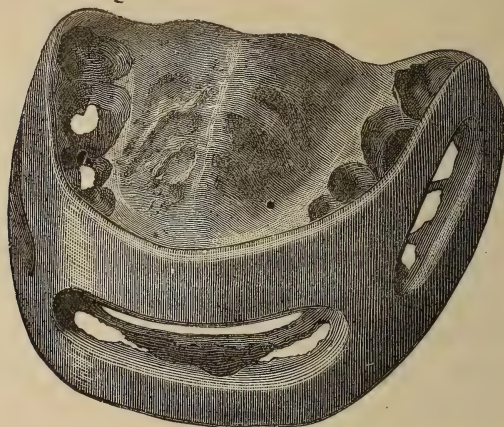


Fig. 8.—GUNNING'S SPLINT.

tened together by two movable clamps. (Fig 9). To apply the splint the mouth plate is lined with gutta-percha which is

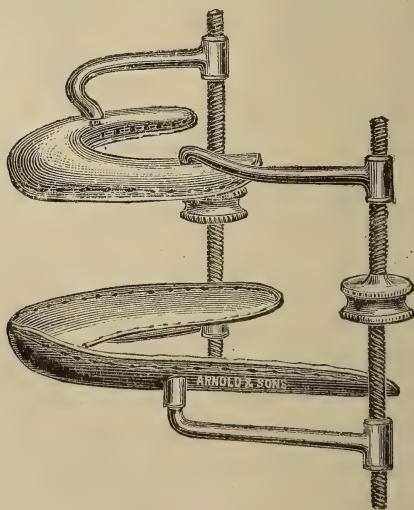


Fig. 9.—ACKLAND'S SPLINT:

warmed and driven down on the teeth and gums. The chin plate, lined with wash leather, is put in position and held-

there. The swivel clamps are then fitted into both plates and by the thumbscrew can be made to clamp the plates together until the requisite tension is attained. The advantages claimed for this apparatus are: (a) It can be quickly and readily applied (b) It can be used over and over again for different patients. (c) The mouth and splint are easily kept clean. (d) It does not interfere with the function of the jaw. (e) It can be used in edentulous cases. The chief disadvantages of any splint having a chin piece is that the pressure of the latter is apt to produce pain and to lead to ulceration or sloughing.

(6). *Ligaturing the Teeth.* This proceeding loosens the teeth and irritates the gums. It should only be used to fix the fracture temporarily until a permanent apparatus can be applied.

(7). *Wiring the Fragments.* This is scarcely ever required for an ordinary fracture, but may be used with advantage when the surgeon has to divide the jaw in performing Syme's operation for removal of the tongue.

ON THE CHOICE OF A METHOD.

The practitioner must determine in each case what will be the most suitable method of treatment.

The following statement will cover the majority of cases met with :—

1. *Fracture of the Body.*

(a) In an adult, with firm teeth in each fragment—Hammond's splint.

(b) In a child—Hayward's splint, the cap being made of vulcanite and lined with gutta percha moulded on the teeth.

(c) When there are not enough firm teeth to fix a Hammond, a Gunning's or Ackland's splint should be used.

2. *Fracture of the Angle, ascending ramus, condyle or coronoid process*—four-tailed bandage.

Whatever method is used it will generally be necessary to

keep the retentive apparatus on for about five weeks. At the end of that period splints and bandages may be discarded, but it is well for the patient to wear a handkerchief tied round the chin and over the top of the head for some few weeks especially at night so as to check any unduly violent movement of the jaw.

THE BICHROMATE PRIMARY CELL: HOW TO MAKE AND USE IT AS A DENTAL MOTIVE POWER.

By HERBERT B. EZARD, L.D.S. Edin.

Mr. President and Gentlemen,—To-night it is by no means my intention to give you a lecture on Electricity. Electrical theory and practice cannot be learned in a night, nor yet in a year. What I hope to accomplish is to show you how you may work a motor, mallet and lamp with a current made by yourself, and controlled by a system almost mechanical, which system you can acquire as easily as that of the vulcanizer or lathe.

The terms *cell* and *battery* are generally erroneously used to signify the same thing. For the purposes of this paper, however, *Cell* means a single jar, *Battery* means two or more jars or cells.

Let me first explain the mechanical structure of a single cell.

The jar is an ordinary glass confectionery jar, 14 inches high, 5 inches inside diameter, costing about 1s.8d. to 2s. by weight. There are three plates or electrodes, two plates being carbon, each 5 inches long, $1\frac{1}{2}$ wide, and $\frac{1}{4}$ inch thick,

and one zinc 5 inches long, 3 inches wide, three-eighths of an inch thick. Cut, not compressed, carbons must be used.

The zinc must be rolled, not cast, and amalgamated by being rubbed over with a little 1 in 10 vitriol and water, and mercury until bright. To each of these plates is attached in the middle of one end a screw, ($1\frac{1}{4}$ inch long), possessing a flat and a milled nut.

To hold the electrodes or plates you want a piece of deal 3 inches wide, three-quarters of an inch thick, with a length of $5\frac{1}{2}$ inch per cell. This wood or *lifter* should have a few coats of shellac varnish or paraffin wax to make it damp-proof.

To construct the cell from these parts, bore a hole in the middle of the wood, pass the zinc screw through, and tighten firmly to the wood with the flat nut. Bore holes for the carbon screws, three-quarters of an inch each side of zinc screw, and tighten up with the flat nuts, join the carbon screws or terminals with a loop of copper wire, and tighten up with the milled nuts, and now your cell is ready for charging, provided all your joined surfaces (or couplings) have been scraped bright with a sharp knife (not emery or sand paper).

A word of advice in passing ; always give each screw its own nuts.

To charge each cell boil up $\frac{1}{2}$ lb of potassium bichromate in two quarts of water until every crystal is dissolved. Allow this to cool and pour into the jar, filling up with warm water to within $1\frac{1}{2}$ inch of top. To this add slowly and carefully 6 ounces (by measure) commercial vitriol. The solution is then stirred with a stick, and must be quite cold before the electrodes are placed therein.

I have arrived at the formula given above after some years' experiment to procure the maximum of labour with a minimum of cost,

The old accepted formula for the charge per cell, three quarters of a gallon size like this is:—

18 oz. Pot. Bichrom, 54 oz. Vitriol (by weight),
 Mine is 8 ,, 6 ,, (by measure).

But you must not forget that part of my formula is the size of plate surface given, the old formula is meant for any size of plate.

As I said at the beginning of the paper, a battery is a number of cells, but before explaining to you how to couple or join up cells into batteries, I must explain to you a few electro-technical terms. These are *volt*, *ampere*, *positive*, *negative*, *series*, *parallel*.

Volt is the pressure of a current. E.M.F.

Ampere is the strength.

To use these cells to their utmost capacity with economy, you require a Voltmeter and Ammeter.

Positive is the current wire taking the current from the carbon plates to the load or machine, and is always known by the symbol + (plus).

Negative is as it were the waste pipe returning from the machine to the zinc plate and is always known by the symbol — (minus).

Series is the running of a current straight through a number of cells thus getting high pressure (or voltage) at low strength (or ampere). In this you take the carbon wire of one cell to the zinc of the next, and so on.

Parallel is the collecting of the current of a number of cells—getting the pressure of only one cell but a correspondingly higher strength. In this you tie all the carbon wires and all the zinc wires into two bundles. It is on the understanding of this series and parallel that your success will depend. I will try and show you by a merely illustrative example.

The practical voltage of a Bichromate cell in working is 1.5—a battery of 10 in series gives therefore 15 volts at say,

1—Ampere. But a battery of 10 cells, in parallel gives only 1.5 volts but say, 10 amperes. There is an ancient illustration of these terms which may make them a little clearer to the non-electrical intellect, as follows :—

Driving two horses (or cells) at tandem, (or series), you get a brilliant speed, (or voltage,) for a short capricious period, (ampere). Put the same two horses, (or cells), in pair, (or parallel) and they will do at a slower pace, (voltage), more work for a longer period (ampere) for the same amount of wear and tear, (exhaustion).

Now how are we to apply the series and parallels of cells, and batteries to practical use? As an answer to this I do not think I can do better than to describe my own installation and the coupling of the cells.

I have 40 cells in 4 parallels of 10 in series, i.e., 4 10-cell batteries in parallel. I think I have explained how to couple 10 cells in series, viz., by joining carbon of first cell to zinc of second, and so on, thus leaving a carbon or positive wire at one end, and a zinc or negative wire at the other; so with 4 10-cell batteries, you have 4 carbon wires and 4 zinc wires. Solder the 4 carbon wires together and you get your positive terminal and your 4 zinc wires for your negative terminal, and to these attach wires or leads to your machinery.

The motor requires from two to four batteries according to heaviness of work, and oldness of charging. The mallet, one battery worked through a rheostat. The light, one, two or three through the rheostat, this depending very much on the voltage or resistance of the lamp and the newness of charging, in fact the cell shows at its worst when used for lighting.

The rheostat of which I speak is a resistance coil which you have to get made and fitted up by an electrician; and with this heavy installation, neither the mallet nor lamp may be used without one. For the Electrical Mallet (Bonwill's) only, six cells are required in series, and these are gradually lowered

into the solution until the desired blow is obtained, a rheostat not being here necessary. The raising and lowering of the electrodes is best accomplished by iron ratchets at each end of your battery box. The electrodes must always be raised out of the solution when not in use, even for half an hour.

Switches are outside the domain of this paper, and a good electric mechanic will fit up and explain their use to you at very little cost.

I think I can only finish up this paper by giving you a rough idea of cost of parts, and working expense.

The cost per cell made by an electrician is about 5s., or 10 cells, in box complete, £4 10s. Carbon plate and screw, 1s. 6d. (new carbons 1s.); Zinc and Screws, 1s. 6d. (new zincs, 1s.) Wire, covered, 1½d. per yard; Bichromate of Potash per hundredweight (varying) £3 2s. 6d. Vitriol, per gallon (varying) 3s.; Charge per cell, 6d., of course also varying. Using 40 cells, per annum, say 200 charges, gives £5, plus say 40 zincs at 1s. = £7 per annum, add to this another £1 for Carbon smashes, jars, &c. = £8 per annum, or roughly speaking, a working cost of 3s. per week. This rather exaggerates than underrates the cost. But for my part I would willingly pay double, or even more to get all my motor, mallet and light work done for me. The total estimate of complete installation including Cuttriss motor, Bonwill mallet, and Fraser Lamp, and all switches, &c., just under £40.

If the Carbons become encrusted with crystals dip in a pot of boiling water. If the Zincs shew signs of unequal action or holeing, remove, clean and re-amalgamate; or if very thin renew.

In conclusion, I must impress on you three points, viz., examine the batteries and wires daily, see that all couplers are

tight and bright, and last, but not least, raise the electrodes when not in use. If you will follow out faithfully the method contained in this paper—allowing no false economy—you will find in this formula of the Bichromate Cell, an unlimited source of easily manufactured motive power for dental purposes.

TREATMENT OF DECAY OF DECIDUOUS TEETH.

By L. G. NOEL, M.D., D.D.S., Nashville, Tenn.

The writer says that this method is a new idea to him, and that time alone can prove its value. He suggests [the free separation of the temporary molars as soon as it becomes evident that they are decayed, with knife-shaped corundum disks, making a decided V-shaped opening that cannot fully close. Where the sixth year molars are in place and there is decay on the distal surfaces of the second deciduous molar, use safe-sided files of the ancient style, and carefully avoid cutting the enamel of the permanent teeth. After making free separations, treat freely with silver nitrate, and have patient return for treatment until a thorough blackening of the dentine is obtained. Where the decay is extensive, nearly reaching the pulp and too deep for the file or disk to entirely remove it, scrape away the softest portions with spoon-shaped excavators, having first thoroughly blackened and sterilized the cavity with the silver nitrate and giving time for structural changes to take place underneath, repeating the cauterization until a smooth, hard, tough, possibly somewhat concaved surface is obtained. All grinding surface cavities should be thoroughly cauterized before fillings are put into deciduous teeth.—*The Dental Headlight*.

British Journal of Dental Science.

LONDON, AUGUST 1, 1895.

DR. BLACK'S EXPERIMENTS.

Our well-known American contemporary, *The Dental Cosmos*, is publishing amongst its original communications a series of papers by Dr. G. V. Black. This gentleman has already made the profession his debtor by much original work, but it is doubtful whether his latest contribution may not prove more interesting to those dentists who always incline to the "practical" rather than to studies in Anatomy and Histology. "An Investigation of the Physical Characters of the Human Teeth in relation to their Diseases, and to Practical Dental Operations, together with the Physical Characters of Filling-Materials." Such is the somewhat lengthy title of Dr. Black's present communication, and we are not sorry that in order to realize the "practical" portion of his work one feels obliged to follow his preliminary enquiries in Anatomy and Physiology. The physical characters of the teeth with reference to their diseases, were dealt with in *The Cosmos* for May. In the following month, the subjects treated upon were "The Force exerted in the closure of the Jaws," "The Stress exerted upon Artificial Teeth," "The Strength of the Teeth," and "The Stress necessary in the Mastication of Food." It will be seen that all these points refer to questions which up till now have been left open. We have frequently heard speculations as to what amount of pressure is ordinarily exerted upon artificial teeth, and some of us had an opportunity during his recent visit to England, of seeing the late Dr. Patrick's instrument for measuring the power of the jaws in closing. It appears to be an extremely difficult matter to accurately arrange an instrument which may be relied upon in the varying circumstances presented, and Dr.

Black only claims that his results are approximately correct. He has had to reconstruct his "gnathodynamometer" upon the lines of the instrument devised by Dr. G. J. Dennis, of Chicago, and even now thinks that the range of error is not much less than ten per cent. The fourth instrument constructed was carefully tested with a register of two hundred and seventy pounds, which the doctor supposed would cover the biting force of the human jaws, but he was again disappointed. A physician, about thirty-five years old, and a large well-formed man with unusually large molar teeth, "simply shut the instrument up." The biting-pads rested on the buccal cusps of the first upper and first lower molars only. But the apparent physical strength seems not to be the controlling factor. People generally stop biting on the instrument because it hurts their teeth, and not because they have exerted the full strength of their muscles. This seems to show that the condition of the periodontal membrane is of importance, for teeth in which the dentine alone is sensitive are found to bear the stress as well as perfectly healthy teeth. A table of records in fifty cases, in which the occupation, sex, age, height and weight are given, show interesting results varying from a little girl, aged seven years, with a bite of sixty pounds, to an athlete, six feet high, one hundred and sixty, and three dentists with 240, 160 and 100 respectively.

With regard to artificial teeth, no particular effort was made to obtain many tests, but in a certain number of cases with full dentures, the stress has been from twenty to thirty pounds. It seems that the full force cannot well be exerted when the mouth is opened sufficiently wide in such cases to bite upon the instrument, but with all allowance for this, Dr. Black comes to the conclusion that artificial teeth are sadly deficient in masticating power when compared with the natural organs. Probably the condition of the gums has a controlling influence analogous to that of the periodontal membrane in his other cases. The strength of the dentine and enamel having been dealt with in the previous paper, Dr. Black now gives his results when ex-

perimenting with the tooth as a whole. They go to show that if the substance bitten upon can be even slightly indented by the cusps, no possible exertion of muscles is capable of injuring a tooth ; this accords with clinical observation. Another ingenious instrument, also with a long name, is the Phagodynamometer, which was devised to determine the stress necessary in masticating different articles of food. Beef-steak, regarded as tender, was found to crush at about forty pounds. " Many of the crusts from ordinary baker's bread when subjected to stress between the molar teeth, will not be cut through with a stress of two hundred and fifty pounds."

Many interesting questions arise from these experiments, some of which are ably dealt with by Dr. Black. We have only been able to draw attention now to the necessity for dentists to read these papers ; the one published in July deals with the subject of Filling Materials, and is crowded with suggestive experiments with amalgams, which we hope to allude to later.

LEADEN FORCEPS —In a very interesting communication by Dr. Luigi Sambon to the *British Medical Journal* an account is given of the custom of making offerings to the gods among the ancients. Many of these donaria were thrown into the water at some hot or mineral spring in which the patients bathed or from which they drank. In the temples of healing gods were gathered surgical instruments, pharmaceutical appliances, or images of various parts of the human frame shaped in metal, stone, and terra-cotta. Amongst the surgical instruments offered by patients and surgeons as a thanksgiving, a quaint one is described which will doubtless appeal to the conservative dental surgeon. It is recorded that Erostratus offered to Apollo, in the temple of Delphus, a forceps of lead to show how little he approved of the extraction of teeth which were not loose enough to be pulled out by the fingers.

DENTAL HOSPITALS.—The objections which are sometimes raised against the establishment of special hospitals hardly hold good in the case of a dental hospital, which provides the special curriculum necessary for dentists. There is, of course, the difficulty of preventing abuse by people who are able to pay a private practitioner, and this obtains also at the General Hospitals, but we imagine that there is not much scope for the recruiting of private practice by the members of the Staff of a dental hospital. Mr. Henry Sewill, however, in the *Medical Press* has a different complaint to lodge. He thinks that the money spent upon unnecessary special hospitals should be devoted to the support of the General Hospitals. He instances particularly the case of Charing Cross, and after enumerating the various special Institutions near to it, selects the Dental Hospital in Leicester Square as being a good illustration of the waste of public money. It is suggested that every General Hospital with a medical School ought to have a dental department adequate for thorough instruction of students in dental surgery.

THE AMERICAN DENTAL SOCIETY OF EUROPE.—This Society has now issued its programme for the twentieth meeting which is to be held on August 5th, 6th, and 7th at Boulogne. The usual papers and demonstrations are to be supplemented by verbal reports of cases in practice and more time is to be devoted to these than has been hitherto allowed. Dr. Charles W. Jenkins, of Zurich, is the President and there are more than sixty names on the list of active members. We hope to publish the papers and a report of the proceedings. Amongst the communications promised is one by Dr. Cunningham on the advantages of systematic training in Mechanical Dentistry, whilst Dr. G. C. Daboll of Paris, is down for "The Mission of the Matrix." The subject chosen by Dr. A. C. Hugenschmidt is "On certain biological properties of human saliva." The arrangements for social functions and dinners appear to be quite up to the

usual standard and the meeting will be held in the height of the Boulogne season.

PROPOSED MEMORIAL TO PROFESSOR HUXLEY.—It has been decided to establish in connection with the Charing Cross Hospital Medical School a permanent memorial to one of its most distinguished students, the late Professor Huxley.

To this end the following committee has been formed : Sir Joseph Fayrer, K.C.S.I., F.R.S.; Sir Guyer Hunter, K.C.M.G., (both old friends and fellow students of Prof. Huxley at the Charing Cross School). Dr. Watt Black, (Hon. Treasurer), Mr. J. H. Morgan, Mr. Stanley Boyd, Dr. Montague Murray, and Mr. H. F. Waterhouse, (Hon. Secretary).

It is proposed that the memorial shall take the form of an annual Lecture and a Science Scholarship and Medal, but the final decision will depend upon the wishes of a general meeting of the Subscribers.

Subscriptions will be received and acknowledged by Dr. Watt Black at the Charing Cross Hospital Medical School.

PRESENTATION TO MR. W. R. HUMBY.—The Staff and many old Students of the National Dental Hospital invited Mr. Humby to dinner on the 25th ult., and took the opportunity of presenting him with a handsomely illuminated address on vellum. This referred to the regret with which his late Colleagues regarded his resignation after many years service upon the teaching Staff, and requested his acceptance of a valuable picture by the well-known artist, Mr. George C. Haité. Mr. Harry Rose, as the oldest member of the Staff, was called upon by the Dean to make the presentation, and referred in happy terms to the part taken by the guest of the evening in the various successes and vicissitudes in the history of the School. Mr. Humby having suitably responded, the rest of the evening was devoted to toasts, songs and recitations. The presentation picture has been reproduced in the *Art Journal* for February last, and is a study of "Rain Clouds."

MECHANICAL TREATMENT IN JAW OPERATIONS.—The advice and help of Dental Surgeons is sometimes asked for in cases where a considerable portion of the mandible has been removed. Mr. Stanley Boyd has reported to the Odontological Society his experience of trying to keep the ends of the bone apart whilst cicatrization takes place. Where one half, or a large part, has been removed, the remnant becomes drawn inwards and a proper articulation of the teeth is impossible. Attempts have been made at Immediate Prosthesis, and we recorded last year the report of a case by M. Michaels, in which he constructed an iridio-platinum bridge to replace the lost bone. This was put into place by a second operation when healing after the first was complete. Mr. Newland-Pedley now publishes in *The Lancet* a description of a modification of Gunning's splint which he has used. The upper jaw was covered with gold and vulcanite, and to this was affixed a shield of vulcanite passing almost vertically downwards and preventing the lower jaw from deviating inwards when the mouth was opened to an ordinary extent.

THE ANTITOXIN TREATMENT OF DIPHTHERIA.—Dr. Ruffer, of the Institute of Preventive Medicine, who is well-known for his bacteriological work, unfortunately inoculated himself with diphtheritic poison whilst engaged in experiments. He was treated by the antitoxin method, and although at one time dangerously ill, has, we are glad to learn, entirely recovered.

THE METRIC SYSTEM.—Some time ago we drew attention to the disadvantages which wholesale manufacturers were subject to in their business relationships with the Continent. Although receiving orders for goods in quantities according to the Metric System, they were warned that it was illegal to execute them in this fashion. A Select Committee has been enquiring into the subject, and as a result, recommends that

the Metric System shall be at once legalised, that it shall be taught in all public schools, and at the end of two years be made compulsory.

SEPARATORS.—Dr. A. F. Emminger, Columbus, thinks Dr. Perry's separators are good things if judiciously used. They can be applied so easily that they have been abused many times. We don't need as much space as we sometimes make. He has used them in the anterior teeth and also in the bicuspid for getting a slight separation, enough to allow for finishing. He has an appliance that is a small straight steel instrument or inverted wedge, very thin, about an inch and a half from the end of the instrument, as thin as ribbon polishing strips, German silver. He slips that between the teeth and drawing it instead of pushing, it draws the teeth apart as much as necessary without much pain, and after putting a plug between the teeth, drawing the separator back, remove it, and you can gain space very quickly, and without any irritation. He does not know whose instrument it is or who invented it. These rapid mechanical separators are good in their place if properly used, but they are abused many times, and the separators are not at fault, it is the power behind.

HÆMORRHAGE AFTER EXTRACTION.—Dr. James McNaught in the *British Medical Journal*, says he has a simple method of stopping persistent bleeding after the extraction of teeth. It has proved quite effectual in cases where plugging, various styptics, and the actual cautery had been tried without success. A double silk thread is passed through both sides of the torn gum and then tied firmly over the alveolar border; the stitch may be removed at the end of forty-eight hours. The doctor says that in every case in which he has tried this method, the bleeding stopped immediately and permanently. We suppose the *rationale* is the retention, with some pressure, of the clot forming in the socket, but in some of the rarer

cases where the difficulty lies in the peculiar blood condition with non-coagulation, or in the hæmorrhagic diathesis, we imagine the suggested treatment might not only prove unavailing but might be positively contra-indicated, as it involves making additional wounds.

COPPER POINTS.—C. D. Hand recommends the use of copper points, made from wire, such as are used for electric bells thus : Fill the apex of root with chloro-percha. Moisten a small gutta-percha point in chloroform and press down. Heat the copper point and drive home. If the proper length is first taken and the larger end flattened slightly, it is a support for alloy which will adhere closely to the copper, that cannot be excelled. Employing the gutta percha point first prevents any discolouration of the tooth.

THE DENTAL HOSPITAL OF LONDON.—The medical staff and lecturers of the Dental Hospital of London, Leicester Square, had a *conversazione* at the Royal Institute galleries, Prince's Hall, Piccadilly, on Thursday. It was preceded by a distribution of the prizes lately won by the students of the London School of Dental Surgery. Mr. William MacCormac, who performed the ceremony, remarked that he had been able to see a little of the work going on at the hospital. He had been much impressed by the extent of that work, and also by the somewhat insufficient accommodation for its purpose which the present building afforded. It appeared to him that a new and larger hospital of the kind was urgently needed. The teeth formed an essential part of the human organism, and on their well-being much else depended. They were second to no organ in their anatomical and pathological interest, and the comparative anatomy of teeth was, to his thinking, a fascinating subject. The teeth had no isolated, although they possessed a special, pathology; and perfectly to understand them implied a knowledge of the body as a whole.

Abstracts of British & Foreign Journals.

SOME CONSIDERATIONS ON THE CHLOROFORM QUESTION, SUGGESTED BY THE REPORTS OF THE HYDERABAD AND "THE LANCET" COMMISSIONS.

By T. LAUDER BRUNTON, M.D., F.R.S.

ACTION OF ANÆSTHETICS ON TISSUES GENERALLY.

Alcohol, ether, and chloroform are all protoplasmic poisons. If pure alcohol be poured into a cut it will irritate the sensory nerves and burn like a red-hot iron, while it will coagulate and kill the blood, muscle, or any albuminous tissues, rendering them hard and unfit for the functions of life, and it will precipitate any soluble albuminous bodies. This can be well seen by mixing a little beef juice or albuminous urine with some pure alcohol, when the whole of the albumen will be thrown down as an insoluble precipitate. What we thus see happening in a test tube has been supposed to occur also in nerve cells, and the anæsthetic action of alcohol and its congeners has been supposed to be due to their causing a condition of semi-coagulation in the nerve cells, or at any rate such a change in the substances composing them, so as to render them sluggish and incapable of performing their functions. In the mucous membrane of the mouth we may see the same action of alcohol, for a little spirit held in the mouth will soon render the mucous membrane of the cheek white by causing superficial coagulation of its albuminous constituents. We can here notice how much stronger the action of chloroform is than that of alcohol, for it not only causes much greater irritation but much more rapid and excessive whitening, and, indeed, it causes similar whitening even on the skin.

LOCAL IRRITANT ACTION OF SOME ANÆSTHETICS.

On account of their action on albuminous substances both alcohol and chloroform have a powerful local irritant action, and if held long in the mouth or applied to a piece of skin denuded of epidermis will burn almost like a red-hot iron. If alcohol be applied to the skin and its evaporation prevented by covering it with oil-silk, it will cause a feeling of burning. This is still more marked in the case of chloroform, and the

burning may become so painful that it can hardly be endured. If chloroform be put on the face or its concentrated vapour be inhaled it may cause much irritation of the sensory nerves of the face, nose, and trachea, and through them affect reflexly both the heart and respiration.

ACTION ON THE NERVOUS SYSTEM.

But the vapour of all anæsthetics when inhaled in such dilution as to produce no local or reflex irritation affects the nerve centres first, and usually does so in a definite order, the highest and most complex going first and the most fundamental going last. Judgment and power of thought disappear first, next sensation and voluntary motion, next reflex action, then respiration and lastly, cardiac pulsation.

ACTION OF ANÆSTHETICS ON THE CIRCULATION.

If instead of putting liquid alcohol or chloroform into the mouth the vapour only is inhaled no pain and no whitening will be induced. We thus see that the effects of the drug upon the tissue depend very much upon its concentration. What is true of the mouth is also true of the other tissues of the body. Alcohol, ether, or chloroform will destroy any one of them if applied to tissue in a concentrated form, but when diluted will act rather as a stimulant, and will produce no marked injury. When chloroform is injected into the artery, of a limb it will coagulate all the muscles and make the limb as stiff as a board ; when injected into the heart, or when the heart is plunged into it, the muscular substance of the organ will be coagulated and its motion arrested, and if the heart of a frog be suspended in sufficiently concentrated chloroform vapour its movements will also cease ; even nitrous oxide gas will kill the frog's heart if sufficiently concentrated.

EFFECTS OF DILUTION

But the effect is different when chloroform is inhaled, because the respiratory centre in the medulla oblongata is more readily affected by chloroform than is the heart, and therefore, when the blood has taken up a sufficient quantity the respiration is paralysed, while the heart continues to beat. In this respect the action of chloroform resembles that of ordinary asphyxia, whether produced by the inhalation of carbonic acid, by clogging of the bronchial tubes with mucus, by consolidation of the lungs in pneumonia, or by collapse of

the lung from a penetrating wound of the chest. Both clinical experience and physiological experiment conclusively prove that chloroform, as well as alcohol, ether, nitrous oxide gas, and carbonic acid, all cause death when *gradually* inhaled by producing paralysis of the respiration, and that a period of time, longer in some cases and shorter in others, elapses between the stoppage of the respiration and the stoppage of the heart. But long before the point of danger has been reached, anæsthetics—alcohol, ether, and chloroform—lower the blood pressure. This primary and constant fall depends, at least in part, on that dilatation of bloodvessels, which leads to a glow on the skin after alcohol has been taken. It is not dangerous; on the contrary, it is rather associated with the rapid circulation and consequent stimulant effect which is so well known in the case of alcohol, and like the fall of blood pressure produced by nitrite of amyl, may be useful instead of injurious in the case of a feeble heart by lessening the resistance it has to overcome. Some very interesting observations on this subject were made by the late Dr. Anstie and recorded by him.

As the primary fall of blood pressure is a constant consequence of the administration of an anæsthetic, even of alcohol, and occurs, so far as we know, in all cases, in those who become unconscious without a single bad symptom as well as in those who do not, we may dismiss it from consideration as a source of danger, and need not trouble ourselves much as to its cause. In all probability it is due, or chiefly due to vaso-motor paresis, as held by the Hyderabad Commission, and proved by the experiments of Lawrie and Chamarette, of Hare and Thornton. It is probable that the fall may in some animals or some persons be aided by simultaneous weakening of the heart, as held by Gaskell and Shore. But whether this be so or not is of no practical importance in regard to death during anæsthesia, though it is of very great scientific interest. It is hardly necessary to add that this primary fall is carefully to be distinguished from that which occurs from an overdose, for if the administration of the anæsthetic be pushed too far all the functions will fail, and the heart will become feebler, the blood pressure will fall continuously, and its depression, at first slight and harmless, will finally become so great that the blood will cease to circulate and the animal will die.

ACTION OF ANÆSTHETICS ON THE PULMONARY CIRCULATION.

This subject was examined by the Glasgow Committee, consisting of McKendrick, Coats, and Newman. They found that the action of chloroform, ether, and ethidene upon the lungs consists in retardation and subsequent cessation of the circulation, first in the capillaries, then in the small arteries, and lastly in the larger vessels. The epithelial cells with their nuclei in the alveoli become invisible. The capillaries are contracted and their walls become less distinct, and the blood corpuscles present in them are partially dissolved. These phenomena are chiefly those of inflammation, due to the action of chloroform as an irritant. The consequences of arrest of the pulmonary circulation have already been considered under the head of death beginning at the lungs. When the vapour of any anæsthetic, even of chloroform, is sufficiently diluted its local action on the pulmonary circulation will be small; but if a concentrated vapour enters the lungs either from being driven in by artificial respiration or drawn in by a sudden deep inspiration it may prove a serious factor in stopping the circulation.

THE REAL DANGER FROM THE HEART.

The real danger which is dreaded, and most justly, by anæsthetists is not a mere weakening of the pulse, nor even an occasional intermission, but a stoppage of the heart, which appears to be sudden and complete, which yields to no treatment, and persists in spite of all attempts to restore the cardiac pulsations. This may occur simultaneously with the failure of respiration, or may apparently precede it.

NATURE OF THIS DANGER.

The symptoms recorded are those of neuromyolysis, as given by Caspar, and the question at once suggests itself, (1) Are these symptoms produced, as in Casper's cases, by suffocation: or (2) are they due to the shock of operation, or (3) are they really caused by the anæsthetic? Previous to the report of the Glasgow Committee it was generally believed that even though chloroform might weaken the heart its action was gradual, but that Committee observed in several experiments a sudden slowing or stoppage of the heart with a great consequent fall of blood pressure. These sudden, unexpected, and apparently capricious stoppages were attributed by the

Committee to the action of chloroform. The cause of such stoppages was carefully examined by the Hyderabad Commission, which came to the conclusion that they were not due to the anæsthetic, but to irritation of the vagus by asphyxia. By the Glasgow Committee the action of the vagus was regarded as a source of danger : by the Hyderabad Commission, at the suggestion of Dr. Bomford, as a safeguard to the animal by preventing too much chloroform reaching the medulla. These opposite views have each experimental evidence in their support. The action of the vagus is indeed complex ; it would appear that it may at one time be beneficial and at another prejudicial. It is certainly remarkable that in an animal like the rabbit, which may sometimes have difficulties in the way of breathing freely in its burrow, the vagus seems peculiarly easily irritated by stimulation of the nose or closure of the nostrils. Moreover, it is almost impossible to stop a healthy heart permanently by irritation of the vagus however strong or long continued. These facts seem to show that stimulation of the vagus is not dangerous, but rather beneficial so long as the heart is healthy. But, on the other hand, when an animal is suffocated and just about to die, the respiration and cardiac pulsations having both stopped completely, it has been found by Dastre and Morat that the heart is not really paralysed, but is inhibited by the vagi, and when these nerves are cut it will again begin to beat. It would thus seem that just as the heart is failing the action of the vagus puts a final stop to it. Here the vagus seems harmful, and one would naturally think that if the division had been made earlier death might have been averted. But experiments showed that this was not so, the contrary being the case and the heart failing earlier. But whether we regard the effect of the vagus in stopping the heart as useful or prejudicial, the occurrence of such a stoppage during anæsthesia is a sign of danger because it indicates more or less interference either with the respiratory movements or the respiratory passages, a condition which, as Casper has shown, may lead either to death by asphyxia or by neuroparalysis (shock.) The similarity between many cases of sudden death occurring during the administration of anæsthetics, and especially chloroform, and those of death by shock from simple strangling or throttling strongly suggests that they result from the same cause—viz., *neuroparalysis* due to interference with the respiratory passages.

FLASKING RUBBER PLATES.

By GEORGE B. SNOW, D.D.S.

Before flasking the plate, which is now secured to the model and "waxed up," as it is termed, attention must be paid to its peculiarities, as different plates will require different treatment. It may have either plain, or gum teeth, or both. The teeth may be set close to the model, and be intended to bear closely against the gum, or they may be at a distance, the rubber extending under them, and making the fit. The alveolar ridge may be thin and projecting, or low and of easy draft. We may have a facing of pink rubber, with either red or black rubber behind it. The manner in which the model and plate are to be placed in the flask will be modified according to these circumstances.

If the teeth are set close to the model, the latter is made thin, and set low in the flask, or possibly a deep bottom flask is employed. The plaster is built up against the teeth to their cutting edges or grinding surfaces, and the teeth thus retained in contact with the model, and the intrusion of the rubber prevented as far as possible. If the rubber passes under the teeth, forming a band above the artificial gums, when gum teeth are used, the position of the model in the flask will depend upon the shape of the alveolar ridge. If it be thin and projecting, and especially if the gums of the section teeth are set close, and hook over it, the front of the model must be raised, so that the projecting portion will be parallel, or nearly so, with the guide-pins of the flask; otherwise there may be a breakage when the flask is opened. For such cases, the parallel sided guide-pins of the ordinary flask are rather objectionable; and they can be improved by filing away a corner on each pin, nearly, but not quite, to the face, so that the two halves of the flask may move diagonally, and thus follow the lines of the model in these difficult cases. The plaster outside the teeth must, when gum teeth are used, the rubber passing under them, be kept low enough to make the parting line pass along the rim above the gums. Or if plain teeth are used with pink rubber facing, the parting should be at the very edge of the rim, so that any escaping rubber can pass into the gateway without dislodging the pink. The appearance of a streak of black or red rubber in the

middle of the pink facing is not likely to induce perfect composure of mind, and it is always best to make the parting joint where it will be the least likely to allow of it. If it is desired to save the model after vulcanizing, provision must now be made for its being easily got out of the flask. The exposed edges below the plate are cut away, and the model is then treated with soap. A little rapping will then bring plate and model out of the investment.

In case of full sets, mounted with section teeth, this is a good time to do something toward counteracting the effects of contraction. I would recommend, for this purpose, a jack-screw, its points to be embedded in drops of wax, placed closely under the second molars, or as far back on the plate as possible. If the jack-screw is then wrapped in tin foil, the plaster will be kept from it, and it will come out of the flask in good condition.

The operator having a clear idea of the exact position the plate and model are to occupy in the flask, the lower section of the latter is now partially filled with plaster. The exposed part of the model is set into water for a few seconds, long enough for its surface to take up enough to prevent its abstracting too much from the fluid plaster, and it is then quickly carried to its position in the flask, and held there for a few moments until the plaster has solidified sufficiently to retain it. There is a point to be observed here as to the wetting of the model. If it is not wet it may take up the water from the investment so quickly that it cannot be carried low enough in the flask. If it is thoroughly soaked, it will not abstract any water from the investment, and it may become necessary to hold it for a long time before the latter will acquire consistence enough to retain it in position. When it is so retained, the filling of the lower section of the flask is completed, the plaster being built up against the teeth, if this is required, and otherwise suitably disposed to form a parting. When hard, it is cut away with a knife to smooth and correct the surface. To prevent its sticking to the other half of the mould about to be made, it may be varnished and oiled, or covered with a strong lather of soap, to be rinsed off. Either way accomplishes the purpose.

The ring section of the flask is now put on, care being taken to see that it fits accurately, and it is filled with plaster. This should be mixed thin enough to pour readily, and poured into one place; the plaster being allowed to run around as the flask fills to expel the air before it. It may be assisted

by jarring the flask. When full, the cover is put on, and the flask is allowed to remain until the plaster is thoroughly set. Sulphate of potash is often added to the plaster to make it set more quickly ; but I do not approve of the practice, as I do not believe the plaster is as hard with this addition as without. It may also be observed that there is little or nothing gained by using very little water in the plaster. Enough may be used so that the mixture will flow quite readily, and when set the mass will be as hard as though less water were used. I believe in allowing plenty of time for the plaster to become thoroughly hardened before vulcanizing, and I believe that the darkening of the joint, when section teeth are used, is, in some instances, partially at least, owing to the undue hurry of the dentist to set the case into the vulcanizer.

The flask is now warmed sufficiently to soften, without melting the wax of the base-plates, and its halves separated. The base-plate is now carefully removed and saved, in order that the amount of rubber necessary to replace it may be ascertained. After its removal, the mould is washed with boiling hot water, to melt and remove any small fragments of wax which may have been overlooked. Gateways are now cut for the reception of surplus rubber by removing the entire parting face, excepting a narrow margin surrounding the mould. This, I insist, should never be cut into, it being one of the vital points in doing good vulcanizing that the rubber in the mould must be absolutely imprisoned, having no opportunity of escape when the flask is fully closed. The removal of the surface, as described, is imperative, for if it is left, the escaping rubber will be squeezed into a thin sheet, which will resist and render impossible the perfect closure of the flask. I do not think of any circumstances under which I would leave any of the parting surface, except the narrow margin I mention, nor do I know of any in which I would cut passages through it, except when the flask is to be closed and rigidly held closed by bolts or clamps, either of which are an abomination.

To give the rubber a smoother surface, and to prevent the adhesion of the plaster to it, the surface of the mould, or at all events that of the model, is now either covered with tin foil, or treated with collodion or liquid silex. The former is cemented to the model with thick shellac varnish, and if afterward rubbed with soap, it is quite readily peeled from the rubber. Thin foil, such as is used for filling teeth, is used for this purpose, and if it should stick to the rubber it can be dis-

solved by immersing the unfinished plate in a bath of hydrochloric acid for a short time. The action is hastened by the addition of a small quantity of nitric acid.

Collodion is sold at the dental depots under the name of the ethereal varnish, and at an extravagant price. Any photographer can furnish plain collodion, which will answer the purpose equally well, and for less money. This is painted on the surface of the plaster before packing the mould.

Liquid silex or soluble glass is quite largely used for coating the mould, and serves an excellent purpose, but it requires some precautions in its use to attain the best results. First, the surface of the plaster must be clean, so that it will freely absorb the silex when applied. If it has been oiled, or if wax has been melted into it, the silex will not be absorbed, and though it may be of some benefit, will not be fully successful. Secondly, the silex must be quite thin, and should be diluted by the free addition of boiling water. It must be kept free from fragments of plaster or other dirt, as it is easily decomposed. Thirdly, it should not be applied until a very short time before the mould is to be packed and vulcanized. After a few hours the silex is decomposed by the action of the plaster upon it, and a part, at least, of its good effects will be lost.

That portion of the mould which is to form the lingual surface of the plate should be carefully examined before the application of any coating to it, and if there are any little humps or protuberances upon it, they should be shaved off with a sharp knife. Each one of these will make a hollow in the lingual surface of the plate, and increase the amount of labour necessary to scrape and finish it.

If section teeth have been mounted upon the model, it now becomes necessary to protect the joints against the intrusion of the rubber. This may be done by working a little liquid silex into them with a very thin instrument and following it with a little dry plaster. A thin mixture of oxy-chloride or oxy-phosphate of zinc may also be used. In my own practice I have been better satisfied with the results I have attained by the use of a few fibres of cotton wool than anything else I have used. The corner of the joints where the packing is to be inserted should be slightly chamfered when the teeth are set up, and the V-shaped groove thus formed packed with a few fibres loosely twisted into a thread. The ends are secured by forcing them into the plaster above and below.

The next step is to pack the mould, and, though it is not

absolutely necessary to do so, I prefer, and think it is advisable, first to ascertain the quantity of rubber for the purpose. If the base-plate consists entirely of wax, and the plate is to be of ordinary red rubber, twice the weight of the base-plate will fill the mould. This rule will give rather too much black rubber, and scarcely enough light red or pink, as the specific gravities of different rubbers vary widely. The quantity can be ascertained by immersion, by putting the base plate, moulded into a lump, into a narrow vessel partly filled with water, and, withdrawing it, and passing in rubber until the level of the water is restored. The flask should now be warmed, and the rubber softened by putting it on a plate, over a vessel of hot water, and the mould carefully packed. Narrow strips of rubber are first packed around the pins, and the remainder added in as large pieces as may be convenient.

To allow of re-opening the flask after closing it, that it may be seen to be properly packed, a piece of muslin may be laid over the exposed surface of the rubber, or if it has been necessary to pack both sides of the mould, two pieces of muslin may be used to prevent the annoyance of having the rubber stick to both sides of the single piece.

The flask is then to be heated, preferably by boiling it, and then closed, either in a clamp or with bolts. It is then re-opened, the muslin stripped off, and if it is found to be insufficiently filled, rubber may be added. Or, if too much has been used, the surplus, found in the gateways, should be removed.

The flask is now ready for the vulcanizer, but should be either put into a spring clamp, or the bolts should have springs upon them, if they are used for holding it together. The flask should be held under an elastic pressure, so that as the rubber in the mould expands by heat the flask will yield to the pressure thus exerted, and will be prepared to follow up the rubber as it shrinks in vulcanizing, and maintain a steady pressure upon it.

The Dental Practitioner.

Delicate probes of silver wire are recommended by Dr. T. W. Brophy. The finest silver wire may be used. By melting some silver solder on the end to make a small bulb the probe is ready for use.

A FEW NOTES ON DENTAL PROSTHETICS.

By S. GLOBENSKY, L.D.S., Montreal.

Although we must regard the necessity for artificial dentures as great a reproach to dental practice as the necessity for surgery is to the dental practitioner, yet we are forced to admit that prosthetics and surgery are indispensable, and that it is our duty to raise them to the highest possible perfection.

There are two sides to the question as to whether or not the introduction of vulcanite has been a curse to our profession. I am disposed to believe that students are made now in more haste than when artificial substitutes were confined to the more difficult bases of gold and platinum; and I am also disposed to believe that there is a much larger percentage of rude and unskilful work put into the mouths of patients. It is a bad sign of the times when cheapness is the chief object of attainment. We know that in all other branches of industrial art mere cheapness is followed by inferior production. Yet it must be recognized, on the other hand, that vulcanite has brought artificial substitutes more within the reach of the middle and the poorer classes; and yet for this very reason I am disposed to believe that this has made them more indifferent to the preservation of the natural teeth. However, we cannot escape the fact that the public demand this class of dentistry, and I may be permitted to suggest a few points mainly directed to the treatment of the mouth before inserting sets.

First of all, I would ask attention to those cases where the alveolus has undue prominence, sometimes so as to cause positive disfiguration, protrusion of the lips and excessive projection of the teeth. It is a well-known fact that after extraction and the usual absorption of the alveolus, extending over a year, there remains an ugly exhibition of structure, to which it is sometimes impossible, and at all times difficult, to adapt an artistic set that will conceal its own art. Especially is this true, whether we use plain or gum teeth. If it is impossible to use the latter, or elevate the lip under the nostril by pink vulcanite—which, of course, turns dark and is a poor substitute for porcelain gum—then the depressions under and on each side of the nostrils, due to the removal of the long

roots of the cuspids, make a permanent deformity. What shall we do in these cases?

1. As a rule, the cuspid roots are the most solidly fixed in the maxillary. As a rule, they can be easier treated for their preservation, because nature seems to resent their removal. I see no reason why it would not be wiser to excise than to extract their crowns, treat and fill them, and insert the set over the roots. As a rule, I think that the need for gum teeth would not then be so urgent. Of course, to every rule there are exceptions. In case of such treatment, the patient should be instructed to have the roots examined once a year, for fear of elongation and bearing too much upon and weakening the plate.

2. There are very prominent protrusions which would be better treated surgically. After the teeth are extracted, and the gum-line and alveolus border still hang below the lip, there is no reason why the former may not be dissected from the alveolus, and the latter excised or cut down by forceps. In fact, the prospect of any undue protrusion after entire absorption can be effectually prevented by this precautionary surgery, and no possible injury inflicted upon the patient. You will observe that I have not introduced any reference to the opportunities for crown and bridge work, as my object is to deal exclusively with the average demands upon the average practitioner and the means of the average patient.

3. It is not by any means a novel treatment to take an impression for a number of teeth before their extraction, cut them off the plaster model, set them up, and have them ready for insertion the moment they are extracted. But this has been largely limited to partial dentures. There is no reason why it may not be extended successfully for entire sets, if a good impression is secured, and the plaster teeth carefully cut from the model. It enables you also to replace the teeth, one by one, on the model, precisely in the position where nature puts them, and after some experience, it will be easier to do this than to work upon the ragged plaster impression of wounded gaps, left after the forceps have been used. It will too, be observed, that here again this is an advantage in the case of the extra prominent mouths of which I have spoken. It is a fact that a set made in such a way may be inserted a few minutes after the teeth are all extracted, and worn without alteration for four or five years.

4. I attribute most fractures of the alveolus to hasty and rough attempts to extract. Of course, there are cases of

distortion of roots, of exostosis, of osseous union with the socket, which make the exception. But it is not difficult to learn, by previous examination, the condition of solidity of the teeth in the maxillary. In cases where this is very marked, it will follow that if the cuspids have to be extracted they will likely be the most difficult. Now, in order to avoid fractures either of the teeth or of the processes, it is a wise precaution if an anæsthetic can be prolonged, to begin at the cuspids and rapidly follow to the others, especially the first and second molars, and firmly shake or twist these teeth. You see, the object is to loosen the pericementum, which instantaneously inflames, and within a minute the firmest tooth will much easier yield to the applied force of absolute extraction. It is a wrong principle to persist in tugging at an extremely difficult and solid tooth, risking its fracture and that of the surrounding alveolus. It is wiser to be slow and sure.

Ohio Dental Journal.

LINING CAVITIES WITH CEMENT FOR GOLD FILLINGS.

By E. A. BOYCE, D.D.S., Chicago.

I know that in giving theories I am treading on dangerous ground, for many of the theories and some of the facts that we regard as established must soon withstand severe inspection and criticism or go to the wall, but as it is difficult to prove these theories it will also be difficult to prove that they are fallacious.

In a tooth of poor structure we sometimes find a beautiful gold filling with apparently perfect margins, but the colour of the tooth shows extensive decay around the filling; this in spite of the fact that the operation may be from your own hand, or from that of some good dentist. With a cement filling the same condition would not be expected, but the dissolving or wearing away of the cement might be found. Cement will many times arrest decay in teeth that seem to melt away from gold like chalk. I can think of no reason why there should be a recurrence of decay in a properly prepared cavity under gold as cited, any quicker than under

cement, unless it be that the tubuli will allow sufficient moisture to gather under the metal filling to produce decay ; but the tubules being perfectly sealed under the cement filling, the moisture is excluded. If the margin of a cavity filled with a cement that adheres to the walls breaks away, the moisture does not follow the joint between the filling and the dentine, but will penetrate only as far as the fracture extends. Sometimes this is a great advantage, as it prevents decay in the deeper portions of the cavity until there is an opportunity for repair. On the other hand, how many times do we find a small break in the margin of a cavity filled with gold, has allowed the moisture to follow the joint by capillary attraction and decay following, exposes the pulp in a very short time.

Thinking to receive the benefit of the moisture-excluding property of the cement, I began using it in combination with gold by placing a small quantity in the bottom of the cavity and immediately introducing gold (preferably noncohesive or crystalloid). During the condensation of the gold the cement is spread over the surface of the dentine, forming a thin layer adapting itself perfectly to the walls. Care should be taken to condense the gold as thoroughly as in any filling. Of course, the margins should be left free from the cement so that the gold can be approximated to them. A slow setting cement is preferred, and one that will adhere closely to the walls and the gold ; while it should be mixed so as to have a good body, it should not be thick enough to lose its adhesive quality before the gold can be introduced and driven firmly into place.

I had been using this combination some time when an article appeared which advocated the use of cement with amalgam in a similar manner ; the writer of which likened the cement to glue that is placed between two pieces of wood. I think this is a very good simile, the cement being driven into the smallest inequalities of the dentine and gold, as the glue is driven into the pores of the wood.

The Dental Review.

Journals that persist in lowering the standard of dignified expression should be permitted to find their own level, and that will be among those who flourish behind the golden tooth attached to the iron rod, for they can have no place among the self-respecting readers of a dignified literature.

International Dental Journal.

OXYPHOSPHATE OF ZINC AS A FILLING MATERIAL.—ITS ABUSE.

By J. E. WILKINSON, D.D.S.

Zinc oxyphosphate, commonly called cement, bone-filling, white filling or composition, has become an essential in operative dentistry. Among its more important uses may be mentioned, (1) that of a temporary stopping in young anterior teeth ; (2) in deep-seated cavities where pulps are almost exposed (in time often permitting deposits of secondary dentine) ; (3) in the treatment of nerve-canals to retain the temporary dressing and fill the cavity until considered ready for the permanent filling ; (4) as a trial filling over a capping in exposed pulps, and (5) in cases of recent pulpitis ; (6) as an intermediate in deep cavities under gold or amalgam, both preventing thermal shocks and strengthening frail walls ; (7) for inserting crowns and bridges.

Judiciously selected and properly manipulated, in the cases above mentioned, and other conditions and capacities, oxyphosphate has proved to be a great blessing to patients and satisfaction to dentists ; but unfortunately, like many other beneficent materials, it has been very sadly misused and abused.

The most common abuse is in being employed as an ordinary filling material in ordinary cases. Its solubility in the fluids of the mouth, the especial tendency to this, in many cases, at the cervical margin and on palatine surfaces, and the consequent uncertainty of its efficient durability, will not allow it a place as a permanent filling. Its use is perhaps most common with foreign dentists having foreign patients, and with itinerant practitioners, the selection appearing to be made owing to the readiness with which the cavity can be prepared and the filling inserted, at the same time commanding a very fair fee, also the unlikelihood of ever seeing the patient again. In some mouths cement will completely dissolve out in about six months, while in others it will continue in good preservation for as many years. Again, in some cases, while the lower part and body of the filling remain intact, the part just under the gum margin has completely dissolved out, forming a most favourable habitat for a colony of microbes which steadily advance in their operations until often the nerve pulp chamber is penetrated, when an attack of acute pulpitis, or perhaps periostitis, sends the patient to the nearest dentist to find out

why a tooth which was filled should ache. Henceforward his or her confidence in dentists is much weakened and accompanied with a constant suspicion.

Many operators neglect to inform their patients that cement is but temporary, and may last only six months. On the other hand, patients who have been warned, very often wilfully neglect obtaining the required attention. How often have we all had patients come to us, especially from the country, with teeth of fairly good quality, but suffering from neglect, who, upon being advised to have them filled, state their intention of letting them go and getting plates some day, because fillings were not of any use, for they had several filled a year or so ago and they all came out, or So-and-So paid 10 or 20 dollars a few years ago for fillings and is now wearing "false teeth." Upon enquiry, we have generally found these to have been the white fillings, and remark that they are only temporary and dissolve out, to which the reply often is, "Yes, that's the way they did, but the dentist didn't tell us that." In this manner good teeth are sacrificed, and the profession in general is injured.

A second abuse of oxyphosphate is in its manipulation, both in mixing and its insertion. By adding too much powder to the fluid at once its quality is lowered. If too stiff when applied to the cavity, it cannot be perfectly adapted, and the filling is granular, rough and defective. If too thin and soft when applied, it is not desirably tough, but crystalline and brittle. Applying to moist cavities, puncturing with small-pointed instruments when nearly hard, and imperfect preparation of cavities, may be mentioned as injurious. Oxyphosphate is irritating to a pulp partially or almost exposed and its employment as a direct capping is therefore an abuse.

The last abuse of cement to be considered now, is its non-use, referring chiefly to its capacity as an intermediate, in deep-seated cavities, either over a capping where the nerve pulp is partially exposed, or directly applied where the cavity is merely large and deep, for the purpose in either case of lessening thermal shocks, and, perhaps, of strengthening frail walls. How often have all dentists been applied to for relief, by patients suffering from acute periostitis, caused by dead pulps destroyed by irritation caused by large metal fillings, where the insertion of non-conducting intermediates might have prevented the trouble. Not only so, but have we not had even to remove metal fillings actually penetrating the nerve-canals?

In speaking of the non-use of cement, we may allude to neglect of young permanent teeth, badly decayed and of very poor quality.

For anterior teeth and often the posterior as well, the material indicated is cement, which should be replaced as often as necessary.

Dominion Dental Journal.

ALUMINUM.

By G. D. SITHERWOOD.

Commercial aluminum may be readily tested with a knife; if quite pure it cuts smoothly, the shavings turning up similar to pure tin, yet 95 per cent metal can hardly be cut at all, the shavings break off short and a fine grating is felt through the blade. Pure aluminum stands third in malleability, being exceeded only in gold and silver. In induction it stands seventh, gold, silver, platinum, iron, very soft steel and copper coming before it. Sheets of the metal are rolled down to 0.0007 of an inch in thickness and beaten into leaf as thin as gold leaf. Its electrical conductivity is about 55, taking that of silver at 100, but is practically nonmagnetic. Is easily and readily welded by the electric process of Dr. Thompson. The soldering process has proved more difficult, yet there are a number of solders used successfully. A very good solder is formed of 45 parts tin and 10 parts aluminum, applied with a common soldering iron, without flux or preparation of the pieces further than to have the parts to be united filed or scratched to a clean, bright surface.

In swaging use horn mallet and smooth pliers, always keeping a piece of thin tissue paper between the plate and die, also between the counterdie and plate. The tissue paper is a great protection in keeping the plate clean, as there is always danger of driving small particles of zinc or lead into the texture of the plate. It must be frequently annealed, being careful not to overheat, bearing in mind that the melting point of aluminum is about 1,150° F. If the plate is heated quite hot and dropped in cold water it becomes very soft, but at the same time will lose its elasticity, which is undesirable; it should be

left to cool gradually, as when worked thus it will be elastic like coin gold. A German firm engaged in making aluminum states that by long, gradual cooling from a red heat, aluminum can be made so elastic that it can even be used for hair springs for watches.

Dental Review.

NERVE BROACHES.

By M. G. MEELIMNEY, D.D.S.

He has split open many extracted teeth, and in a comparatively large proportion has found that the canals were so restricted that theoretically, perfect treatment would be a very difficult matter.

In cases where nerve broaches cannot be used with full satisfaction, it is necessary to depend for success upon thorough medication of the remaining debris. For removing debris from canals, the prepared nerve bristles are very unsatisfactory. They are either too soft or too brittle, or the barbs rub off very easily. It is a wonder that so many firms keep on making, and so many dentists buying, articles that are of no earthly value to anyone who wishes to do thorough work. A broach must be stiff, springy and of even taper. It must also be cheap and adaptable to various circumstances. Broaches for lower molar roots should be somewhat flattened to suit the canals. The points must be very sharp to avoid pushing debris ahead; while the butt must be of sufficient thickness to give strength.

To make nerve broaches that will do reasonably satisfactory work, take No. 18 piano wire, and draw the temper a little. A little experience will enable one to draw to any desired temper for any particular case. A Bunsen flame will do very well. The wire should be left sufficiently stiff to come back straight when the point is deflected thirty or forty degrees. Place a piece of hard wood end up in the vice, and with the corner of a file cut a light groove parallel with the jaws. This groove is to keep the wire from slipping while it is being filed. Place the piano wire in a pin vice and file it taper with a square section, or slightly flattened for some cases.

Care must be taken to make the taper even from butt to point, or the broach will be liable to break. With a sharp graver nick the square corners of the broach, and the result is a series of barbs that will stand a great deal of use. The barbs may be placed on one, any, or all corners, according to requirement. The butt must be adapted to the particular kind of broach holder used. For a screw chuck-holder the butt should be made square. For a sliding ring-chuck, the butt will stay better if slightly flattened. A foot of piano wire will make nine broaches, and costs less than a cent. One of these broaches will do more work than three ordinary ones at fifty cents a dozen.

Southern Dental Journal.

Reports of Societies.

MANCHESTER ODONTOLOGICAL SOCIETY.

The Annual Meeting of the above Society was held on Tuesday, May 6th, 1895, at the Grand Hotel, Manchester. The President, Mr. W. Dougan, in the chair.

CASUAL COMMUNICATIONS.

The CHAIRMAN said he had an interesting experience to relate. He had occasion to remove the pulp from a lower bicuspid, and there being a little vitality left in the pulp at the apex, he pumped carbolic acid down for the purpose of destroying it. After he had done so the patient complained that he had lost all sensation in his lip. He said it felt big and swelled, although it was not so, and the sensation had not returned the day following. Similar cases, observed Mr. Dougan, had been known to occur in extracting an impacted lower wisdom tooth, where the tooth was in close proximity to the nerve, but he had not met with a case like the one he had mentioned.

Mr. D. HEADRIDGE: How old was the patient?

Mr. DOUGAN: About thirty or thirty-five years of age.

THE RETENTION OF DENTURES IN EDENTULOUS CASES.

Mr. W. SIMMS made a Communication on the above subject, dwelling especially upon the means to be taken to obtain

a well-balanced "bite," in upper and lower edentulous cases.

THE TREASURER'S REPORT.

The Treasurer (Mr. H. Planck) read his annual Financial Statement, which showed that the Society had a balance in hand of £35 11s. 7d.

THE REPORT OF THE COUNCIL.

The Report epitomised the record of the successful work of the past Session, calling special attention to the evenings devoted to practical work, which had attracted large attendances of members. The Smoking Concert held in February was most successful. A respected member of the Society, Mr. E. H. Williams had died during the year.

LIBRARIAN'S REPORT.

Mr. W. A. HOOTON, the Librarian, gave a report of the operations of this branch of the Society's work during the year.

ELECTION OF OFFICERS.

The following were elected office-bearers for the Session 1895-6.

President, Mr. Wm. Simms.

Vice-Presidents, Messrs. W. Dougan, Ed. Houghton.

Treasurer, Mr. H. Planck.

Librarian, Mr. W. A. Hooton.

Secretaries, Mr. F. W. Minshall (Council); Mr. D. Headridge, (Society).

Members of the Council: (the last two being elected at the present meeting):—Messrs. P. A. Linnell, F.W. Masters, G. G. Campion, J. H. Jones, A. B. Wolfenden, G. O. Whittaker.

In vacating the chair, and inviting the President-elect to take his place, the retiring President spoke of the uniform kindness and support he had received from all the members, and especially from the Secretaries in the discharge of the duties of his office.

The President, Mr. W. Simms, thanked the Society for the honour they had done him in electing him President. Following the able men who had preceded him in that office, he might well feel trepidation, but he would serve the Society to the best of his ability.

VOTE OF THANKS.

On the motion of Messrs. D. Headridge and Taylor, a cordial vote of thanks was passed to the past officers of the Society for their excellent services during the year. The resolution was responded to by Mr. Dougan and Mr. Linnell.

EDINBURGH DENTAL STUDENTS' SOCIETY.

At a meeting of the above society, held in the hospital on Friday, 21st June, in the presence of the Dean and a number of the hospital staff, Mr. J. A. Biggs, L.D.S., of Glasgow, gave a clinic on "An Artificial Velum acting Physiologically." By means of casts, models, etc, he explained his method of making dentures for clefts, and then showed an excellent case in the mouth of a patient aged 16, suffering from congenital cleft, which by an ingenious method of moulding, was so constructed as to embrace the uvula, and thus remain in its place during the movements of deglutition.

Mr. H. B. Ezard, L.D.S., at this meeting demonstrated the method of making the Morrison Seamless Crown, both in gold and platinum. Each of the crowns was made in about six minutes.

APPOINTMENTS.

W. H. Goodman, L.D.S., Eng., to be Dental Surgeon to the Devon and Exeter Dental Hospital.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
6. The Journal will be supplied direct from the office on PREPAYMENT of subscription as under:

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British Journal of Dental Science.

N o. 662. LONDON, AUGUST 15, 1895. VOL. XXXVIII.

ORAL SURGERY.

By EDMUND W. ROUGHTON, B.S., M.D. (Lond.), F.R.C.S.
Eng.

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FRACTURE OF THE MAXILLA.

(Continued from page 486.)

Causes. As in the case of the mandible, the most common cause of fracture of the maxilla is a severe injury, such as a kick or a violent blow on the face. In military practice it is often the result of gunshot injuries. Fracture of the alveolus, or of the tuberosity, may occur during the extraction of teeth; it was of more frequent occurrence in former days, when "the key" was in common use.

Varieties. These fractures vary very much in extent; they may be mere fissures with no appreciable displacement, or small splinters may be chipped off, or a portion of the alveolus with its contained teeth may be separated, or the whole bone may be extensively comminuted. It should be borne in mind that fracture of the maxilla may be but part of a much more serious injury, such as fracture of the skull. Fractures of the maxilla are practically always compound, the muco-periosteal covering of the bone being torn and admitting air from the mouth or from the antrum.

Symptoms. When the fracture is only a fissure in bone, it may very readily be overlooked, but the mistake is not of

much importance, as good union will ensue without special treatment. When displacement has occurred the nature of the injury is sufficiently obvious on inspection.

Complications. (a) Hæmorrhage is more common and more severe in fractures of the maxilla than in those of the mandible, on account of the much greater vascular supply of the former.

(b) The teeth may be fractured or dislocated.

(c) The nasal duct may be torn across or compressed, leading to emphysema of the face, and obstruction to the flow of tears into the nose.

(d) The line of fracture may involve the antrum, and lead to suppuration in that cavity. Sometimes foreign bodies or dislocated teeth may lodge in the antrum, and remain there a long time, even for years.

(e) The infra-orbital nerve may be damaged causing anæsthesia or neuralgic pain.

Treatment. The following indications demand attention.

(a) To arrest bleeding by tying any vessel that can be seen, by injecting cold water, or by the use of styptics, or the actual cautery when other means fail.

(b) Not to remove any fragments or loose teeth unless they are quite detached ; the parts are so vascular that fragments which seem sure to necrose, frequently unite perfectly. Should necrosis occur it is easy to remove the sequestrum at any subsequent time.

(c) Any displaced fragments must be restored to their normal position as far as possible.

(d) If the fragments will not remain in position of their own accord, they must be fixed by means of some form of splint such as a gold plate or a modified Hammond or Gunning's splint.

(e) The mouth must be kept as aseptic as possible by

syringing with boracic lotion or Condyl's fluid, and dusting the parts over with a powder composed of equal parts of iodoform, creolin and boracic acid.

DISLOCATION OF THE MANDIBLE.

Dislocation of the mandible may be bilateral or unilateral, the former being the more common in the proportion of about 3 to 2. It is more common in middle-aged, than in very young or very old people. This is due partly to the greater exposure of persons of middle age to injury, and partly to the ramus being more nearly at a right angle with the body of the bone, than it is at the extremes of life.

Causes. Dislocation can only occur when the mouth is opened widely. In this position the condyle advances upon the eminentia articularis, and may be precipitated over it by *muscular action* or by *external violence*. The external pterygoid is the muscle which pulls the condyle over the eminence when the mouth is wide open. This may occur during vomiting, yawning, laughing, shouting, etc. The violence which produces a dislocation may act from without, as a blow, or from within, as by forcing large objects into the mouth, by taking a model or by extracting teeth without supporting the jaw from outside. Probably in all cases the action of the external pterygoid muscle is an essential factor.

Pathology. When the parts are dissected the following conditions are found :

The condyles are in front of the eminentia articularis ; the inter-articular cartilages remain attached to the condyles ; the capsular ligament is stretched, but rarely torn ; the external lateral ligament is tense, and its natural obliquity reversed, so that it slants from behind forwards instead of from before backwards ; the internal lateral and stylo-mandibular ligaments are stretched ; the coronoid processes

are surrounded by the temporal muscles, and are well below the lower margin of the malar bone when the mouth is wide open. If an attempt be made to close the mouth without reducing the dislocation, the internal lateral and stylo-mandibular ligaments are rendered still more tense, and the coronoid process impinges on the lower margin of the malar bone, only some fibres of temporal muscle being interposed. Mr. Christopher Heath denies that the fixity of the dislocated mandible is in any measure due to contact with the malar bone, and in support of his view, he gives in his well-known book an illustration prepared from a dissection of a dislocation artificially produced on the dead body. In this drawing (Fig. 10), which I am permitted to reproduce,* it will be seen

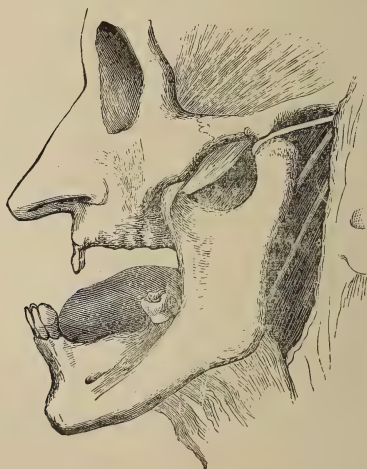


Fig. 10.—DISSECTION OF DISLOCATION OF MANDIBLE.
(C. Heath.)

that although the condyle is not in front of the eminentia articularis, yet the top of the coronoid process is very near the lower edge of the malar bone and would actually impinge

* I am greatly indebted to Mr. Heath, for his kindness in allowing me to use several of the illustrations from his work.

upon it if an attempt were made to close the mouth. He also says "were the coronoid processes fixed against the malar bones, it would be impracticable to effect a reduction by elevating the chin." With the greatest deference to so distinguished an authority, I venture to question the truth of this statement. In reducing the dislocation by raising the chin the coronoid process rests against the malar bone as on a fulcrum; as the chin is raised so the condyle is depressed, and made to retrace its steps as far as the summit of the *eminentia articularis*; from this position of unstable equilibrium but slight force is necessary to send it back into the glenoid cavity. Reduction in this manner would not be possible if the coronoid processes became hooked in front of the malar prominences, but such a relation of parts is pre-



Fig. 11.—DISLOCATION OF MANDIBLE. (Fergusson.)

vented by the strong tendinous insertion of the temporal muscle.

The gradual increase in movement noticed in old-standing cases of dislocation is no doubt due partly to absorption of

the coronoid processes from pressure, and partly to stretching of the involved ligaments.

Symptoms. When the dislocation is bilateral, the mouth is wide open and the jaw fixed, the lower teeth being in advance of the upper (Fig. 11); there is a marked hollow immediately in front of the ear; the condyle can be felt in front of the hollow just mentioned, and the coronoid process can be felt behind and below the malar bone; there is sometimes a prominence immediately above the zygoma formed by the abnormal condition of the temporal muscle; it is not certain whether this condition is due to stretching of the muscle, or to spasmodic contraction. The masseters are firmly contracted and stand out in relief. There may be considerable pain from pressure on sensory branches of the fifth nerve, but sometimes no pain is complained of. The lips cannot be approximated, and consequently there is dribbling of saliva, and impairment of speech, the labial consonants being unpronounceable.

In cases of unilateral dislocation the symptoms are less pronounced and may be overlooked; the mouth is not so widely open nor so fixed; the chin is displaced towards the *sound* side, but this deformity may not be obvious until reduction of the dislocation has displayed the natural contour of the face. The deformity directly due to displacement of the condyle and coronoid process is only to be detected on the injured side.

Treatment. Sometimes the patient is able to effect reduction for himself, but in the majority of cases surgical aid is required. The following methods of reduction may be employed:—

(a) The simplest plan is to place the patient in a chair with his head resting firmly on a support. The surgeon standing in front of the patient, having protected his thumbs with a towel, introduces them into the mouth and

presses them as far back as possible on the molar teeth at the same time grasping the jaw with his fingers. Pressure is now made downwards and backwards so as to free the condyles from the eminentia articularis ; the chin is then elevated and the condyles slip back into place. In this method of reduction, the jaw is used as a lever, the fulcrum being furnished by the operator's thumbs.

(b) Wedges of cork placed between the molar teeth may be substituted for the thumbs, and pressure made on the chin by the hand, or by a screw tourniquet passed round the head and beneath the chin. In difficult cases it will be found easier to reduce one condyle at a time, but care must be taken in reducing the second one not to re-dislocate the first.

(c) One end of a piece of wood about a foot long may be introduced between the molar teeth ; by raising the other end the lower molars are depressed, the upper teeth serving as the fulcrum ; the jaw is thus levered back into place, one condyle being replaced at a time.

(d) Stromeyers forceps. These are introduced between the molar teeth of the upper and lower jaws, by closing the handles the blades are separated, the lower jaw depressed, and the condyle disengaged from the eminentia articularis ; the chin is then pressed upwards and backwards.

(e) Nelaton's method. The coronoid processes are forced backwards by the thumb introduced into the mouth.

In cases where any difficulty is experienced in effecting reduction, the administration of an anæsthetic will be of great assistance. After reduction has been accomplished the jaw should be fixed with a four-tailed bandage for a week or ten days. If this precaution is neglected, the dislocation is apt to recur on the patient opening his mouth.

Old-standing Dislocations. It sometimes happens that a dislocation is overlooked, or remains untreated ; in such

cases the patient slowly regains a certain amount of movement, being able perhaps after several weeks to approximate the lower incisor teeth to within an inch of those of the upper jaw, but never sufficiently near for purposes of mastication. He may however be able to approximate his lips so as to regain the power of articulating labial consonants and of retaining his saliva. In all such cases an attempt at reduction should be made, for even if they are not attended with success, they result in considerable increase of mobility from the breaking down of adhesions. The longest period after which reduction has been accomplished is said to be ten months.

Recurring Dislocations. In some cases the ligamentous structures have been so stretched at the time of the accident, or through want of subsequent rest, have so far failed to repair, that they permit the dislocation to recur at frequent intervals. In these cases reduction is usually easy; the difficulty is to effect a permanent cure. This may be brought about by keeping the jaw fixed for a considerable period. Should this method fail after a fair trial, it would be advisable to cut down upon the temporo-maxillary joint and suture the inter-articular cartilage to the periosteal attachment of the capsule to the zygoma.

Congenital Dislocation of the mandible is a rare condition due to malformation of the articulation. It is not amenable to surgical treatment.

Subluxation of the mandible is believed by Professor Annandale to be due to slipping of the fibro-cartilage through laxity of the capsule. Mr. Heath attributes the condition to rheumatic or gouty affections of the joint.

(*To be continued.*)

THE PREPARATION OF ROOTS FOR CROWNING
AND GOLD CROWNS.*

By Dr. CAMPBELL.

It occurred to the President that a discussion on root-filling and gold crowns would prove of interest to all, and, although I have nothing new in connection with either of these, yet it seemed to me the subject was in itself so comparatively new that a discussion of the whole process, from the preparation of the root to the completion of the operation, could not fail to be interesting and profitable to us all.

I do not know to what extent the crowning of molar and bicuspid teeth with gold is practised by members of the Society, but I would encourage those who have not done much of this kind of work to adopt it more readily, as I must say I consider this one of the greatest strides yet made in conservative dentistry. In suitable cases, if the process is carefully gone about, success is almost certain, and many cases of roots, which not so very long ago would have been victims to the forceps, can now be made serviceable for years.

I will state first how we proceed with regard to treating devitalized pulps.

Let us take a typical case:—A patient comes to us with a molar or bicuspid tooth, which has been filled with a large amalgam filling, and, owing to decay or from other causes, the filling has come out and the walls of the crown of the tooth have crumbled away, so that it would be impossible to insert another amalgam filling. Very likely the pulp has been inflamed, and is causing considerable pain. Of course in such a case, the first thing to do is to apply arsenic, which I invariably use in the form supplied by the S. S. White Co.

* Read at the Odonto-Chirurgical Society.

and described by them as the "devitalizing fibre." It contains arsenious acid, creosote, tannic acid, and morphia, incorporated in fibre, and we find it the most suitable form of using the drug. After drying the cavity a small shred is laid on the dentine nearest the pulp, and a sufficient quantity of thoroughly mixed oxyphosphate of zinc (about the consistency of cream) laid over the whole surface of the tooth.

After 48 hours this filling can be removed, and if the pulp is sufficiently destroyed it can be removed at once and the root filled.

Generally, however, I find it better to remove the dentine over the pulp and apply a small dressing of mixture of tannin and glycerine in the pulp chamber, and again seal with oxyphosphate of zinc or gutta-percha.

A week afterwards the pulp can be extracted with less pain, and much more easily, as it generally comes away *en masse*.

In the case, however, of a pulp, which has been devitalised from natural causes (such as exposure, owing to carious dentine, etc.), and become septic, one must proceed in a very different manner.

We have tried several methods, but the one with which we have had best results is the process described by Dr. Emil Schreier, of Vienna, at the World's Columbian Dental Congress, held in Chicago last year, in his paper on the Kalium Natrium process. This consists as, of course, you all know, in taking a small quantity of a prepared mixture of sodium-potassium properly on a barbed broach and applying it into the centre of the root canal or canals. The metals form soaps with the fatty products of the septic pulp (*Cosmos*, page 864).

Some fibres of cotton are then rolled round an ordinary fine broach and saturated with water; this is pushed up into the canals several times, until the whole of their contents are removed. An antiseptic dressing (we invariably use a mix-

ture of "Oil of Cinnamon," 1 part; "Carbolic Acid," 2 parts; "Wintergreen," 3 parts); saturated in cotton wool and then placed in the canals and sealed over with gutta percha. About a week later this dressing is removed, and if the patient has been free from pain the meanwhile, the roots are filled. With regard to the filling of the roots (of course after using rubberdam, etc., to exclude saliva), we dry the canals first with the hot air from an ordinary rubber syringe, then apply absolute alcohol, and lastly, insert the canal plugger heated to red heat. After the canal has been properly dried, we take some of the chloro-percha solution on an ordinary plugger and force into the canal, using a pumping motion.

When we consider the chlora-percha has completely filled the canals, we insert into each a gutta percha cone, and heating the plugger slightly, press it home. We then ask the patient to let us know when he feels a sensation at the end of the root and when this takes place we stop.

We then take a small piece of gutta percha, soften it and placing it in the pulp chamber, with a large burnisher press it home. This ensures the choloro-percha being forced through the apical foramen and effectually sealing the canal.

The root being successfully filled, the next step is to remove all decayed dentine and to shape the walls of the root itself, and whatever part of the crown there is left standing by grinding it down by carborundum wheels and discs, so that no overhanging edges remain, and the walls are as nearly as possible perpendicular. This is very important, as it allows the measuring wire to come off easily.

Assuming that the root is now ready for taking the measure, the next step is to take a piece of fine binding wire annealed and place it round the root just below the gum margin, leaving the ends at the buccal part of the root and

twist them with a pair of flat pliers, until the root is tightly embraced by the wire.

Instead of grasping the binding wire by the pliers, two other instruments are frequently used, but I think the pliers are the most handy, and always use them.

The wire is now removed, care being employed not to change the shape obtained. Should there be any pain experienced in applying the wire, a 5 per cent. solution of Cocaine may be applied to the gum round the root, and left there for a few minutes with advantage.

It is most necessary, of course, to see that the wire is adjusted all round the root, as there is generally a little bleeding; this is frequently difficult, and it is sometimes necessary to use a little cotton wool or lint to mop away the blood.

Where the gum is exuberant, it is most conveniently removed by ethylate of sodium.

The wire is now taken to the workroom and given to the mechanical assistant who is to make the crown. We tell him the tooth to be crowned, and show him how the wire was removed from the mouth. The wire is now laid on a piece of soft wood and receives a smart blow with a hammer. The shape is left clearly marked on wood.

The wire is now cut with scissors opposite the twisted end and straightened out. This gives the exact length of the circumference of the root.

A piece of 22 carat gold plate rolled out to No. 27 American gauge is now cut exactly the length of the wire—the two ends brought together and soldered. The parts of the band which correspond to the mesial and distal surfaces of the root are scalloped out, as the alveolar process rises higher there than on the buccal or palative (lingual) surface.

The whole of the lower margin is then bevelled so that it may adapt itself to any irregularities of the root. The band is then contoured with contouring pliers and shaped so that

the margin next the gum corresponds to the imprint of the wire made previously on the wood. A little X is scratched to show the buccal surface.

This part of the process takes about half an hour. It is now taken to the operating room, where it is driven on the root by means of the crown driver and a mallet, if these are necessary ; generally it is easily placed on the root by means of hand pressure. If the band does not fit the root very tightly, we contour it a little and try it again, and so on until it has a firm hold of the root. I then ask the patient to occlude his teeth to see that the band is free from the opposing tooth or teeth, and take a piece of quite soft Stent and place it in the hollow of the band and instruct the patient to close his teeth. I then mop it over with the edge of a napkin dipped in cold water to harden it quickly and remove the Stent, and generally the band comes away embedded in it. If it does not, however, it can be afterwards removed and placed in position in the Stent. A model and a bite are now made, and when the band is in position in the model a piece of soft wax is placed in the centre, and when hard is carved into the shape of the grinding surface of a molar or bicuspid tooth, as the case may be, so that it articulates with the bite. It has, of course, to be the thickness (size) of the plate (27 guage) that it will be when replaced by gold. It is now placed in a soft composition of modelling clay called moldine, and a metal of low fusibility poured into it. In this, again, when hardened, is poured the same kind of metal, but just on the point of setting, and we thus get a die and counterdie on which to strike up the cap. This is done by using a piece of brown paper first as a pattern and getting the approximate size of the cap and replacing this by a piece of gold of the same carat and thickness already mentioned. After the cap is got, the hollows made by the cusps are filled up with solder, and a catch of ordinary 18 carat plate gold soldered on the under

surface of the cap. It is now attached in its proper position in relation to the band, and soldered with No. 00 or 1 solder. It is then filled up and stoned. We prefer not to put a fine polish on these all-gold crowns, as the glitter of the gold is much more apt to catch the eye when the crown is inserted in the mouth, than if left dulled.

The root being dried, and kept dry by means of the saliva ejector and cotton rolls a sufficient quantity of oxyphosphate of zinc to fill the interior of the crown is mixed very thin (about the consistency of cream) and poured into the hollow of the crown, which is then placed in the root, care being taken to ensure its being driven quite home.

The saliva must be excluded for about a quarter of an hour, and then the superfluous oxy-phosphate of zinc, which has oozed out between the edge of the band at the root under the gum, must be removed by means of a probe or other suitable instrument. If the bite does not come exact, a little can easily be cut from the opposing tooth. This completes the operation, which takes altogether from the beginning four or five hours--three quarters of an hour operator's time, and three to four hours of the mechanic's. In first bicuspid's, when an all-gold crown might be an objection, as in the case of ladies, we frequently finish the crown in the manner above described, and cut a square opening on the buccal wall, into which is fitted an ordinary porcelain tooth. The pins of these are soldered to the crown and the porcelain cut flush with the surface of the crown. This we find an exceedingly useful method, not materially interfering with its strength, while certainly improving its appearance.

ON THE USE OF GUM BODY IN CROWN WORK.*

By JOHN T. JAMESON, L.D.S.Edin., Newcastle-on-Tyne.

Mr. President and Gentlemen,—You are, doubtless, all familiar with the ordinary pivot tooth, and the more elaborate collar crown usually known as the Richmond crown. As crowns, nothing looks prettier than these when well finished, but there is always the great danger of the porcelain face being tipped off. This is an accident which is pretty frequently met with. In the case of the pivot tooth it is not a very long operation to replace it with a new one. In the case of the collar crown, it is quite a different matter. It is difficult to repair satisfactorily in the mouth, as is sometimes done, and if the whole crown is removed there is the great danger of ruining the collar beyond repair, thus necessitating the making of an entirely new one. Now it occurred to me that as the Logan crown, which, as you know, is an all porcelain crown, so very seldom breaks, that if the collar crown could be backed up with gum body in the place of gold, and that providing the tooth and gum body could be firmly united, then we would have the nearest approach to the strength of the Logan crown, with the advantage of the collar, and also of being able to use almost any make of tooth. In the crown I am going to show I contend that, should an accident occur to it, it is very easy to remove all the porcelain remaining, and to fit another tooth of some kind, either temporarily or permanently, upon the cap, without removing it from the root, but upon this point I intend to say something more, after I have explained my process.

The method I pursue is as follows : Commencing with the root I will just give a rough outline of its preparation. Let us suppose that we are dealing with an upper incisor, which

* Read before Edinburgh Dental Hospital, Students' Society.

should, of course, be in a thoroughly aseptic condition. First grind it down to the gum margin or a little under it on the labial, leaving it a little higher on the palatal side, as this high part acts as a buttress to the band, and materially strengthens the crown, but of course this must be according to the condition of the root. Trim off any enamel left, and slightly cone the root, encircle it with a piece of iron or copper wire, and twist with pliers until it is perfectly tight, remove carefully, lay it upon a piece of sheet lead and give it one blow with a flat-faced hammer. This drives it a little into the lead, and, on removing, you see the shape the collar should be. Next cut the wire at the twist, straighten it out, and you will have the length required for the metal of the collar. Take next a piece of *hard* platinum, No. 4 guage, cut it the exact length of the wire and a little broader than you wish the depth of the collar to be when finished. Make a hoop of this, and solder the joint with fine gold. Next adjust the band to, and trim it level with, the surface of the root by means of corundum wheels. Remove the collar carefully and to it solder a cap of *soft* platinum; trim the edges, then lay it face downwards on a piece of flat wood, and through the posterior part of the flat portion of the cap punch several small holes with a pricker, in order to give a roughened surface, and so assist the adhesion of the gum body. The cap is then placed on the root and a pin of hard platinum adjusted to the root canal, leaving a sufficient length of pin protruding to meet the pins of the tooth to be used. The cap and pin are then carefully removed together and soldered with fine gold. This done, place the cap on the root again, and select and fit a suitable tooth to it. If preferred an impression of the mouth can be taken with the cap in position, and the tooth fitted in the workroom. Should any difficulty be experienced in getting the tooth nicely into place on the cap, owing to the position of the protruding pin,

a portion of the tooth between the pins may be hollowed out by means of a thin carborundum disc, thus allowing it to be more easily adapted. After the tooth is fitted and placed in position on the cap, the pins are bent down and against the projecting pin. It is better before doing this to roughen the surface of the tooth where the body has to be applied by grinding a few grooves here and there across it. The whole is then invested and the tooth tacked to the pin, using, as before, fine gold. The next stage is the application of the gum body. I generally use Rose's, as it is a low-fusing body. It should be mixed with distilled water to about the consistency of thick cream, and applied with a camel-hair pencil, care being taken to press it firmly underneath and about the pins and cap, using clean blotting paper to take off the excess of water. When sufficient body has been laid on, leaving it a little fuller than the desired contour when finished, it may be laid aside to dry or put near the fire, if required to be dried quickly. The firing can be done in any of the furnaces used for continuous gum work, but I have always used Fletcher's small injector furnace and the crucible usually sold with it. It is simple, easily manipulated, and answers the purpose fairly well. The temperature can be raised to the fusing point of the gum body much quicker than is actually required, the whole time taken to bake one of these crowns from start to finish only being about ten minutes. The crown should be laid on some asbestos fibre in the crucible, and the heat gradually applied at first, and increased until it is a bright red. The correct heat is only learnt by practice, but it is a safe plan to have some body on a piece of platinum wire or clay pipe stem to insert in the crucible from time to time. By this means we can see when the required heat has been attained. Care should be taken not to overheat, as it is quite possible to fuse the tooth itself, so
werful is this little apparatus. After allowing it to cool,

the tooth may be taken out, trimmed and polished ; it is then ready for use.

There are many other ways in which gum body can be applied in crown work. I have found it very useful in fusing pins into several forms of hollow crowns, such as the Bonwill for instance. Nearly all these forms could be adapted to and fused upon the cap just described. I have also made a few crowns of the ordinary pivot style backed with porcelain, and they seem very strong. The method is essentially the same as in making the ordinary pivot. That is to say, the platinum foil is burnished upon the root, a platinum pin left projecting round which the pins of the tooth are bent and soldered or not ; then the application of the body. It is also very useful for fusing pins into porcelain tips, the holes being drilled by means of diamond points, or if the tip is very small a groove is made with a diamond disc, and a piece of platinum wire bent in the form of a staple, and body packed firmly all round it. The other two projecting points form the pins.

I will now mention what seem to me to be some of the advantages of this collar crown with porcelain backing.

(1) I think that it is stronger than the ordinary one backed with gold, except perhaps in some special cases, as there is not the danger of the front being tipped off, the body and tooth being firmly united.

(2) There is not the liability of the backing altering the shade of the tooth.

(3) It would be useful for lower incisors, and Bicuspid especially, where an incisor was rotated enough to show the backing.

(4) It is very applicable to short upper bicuspid and first molars where a gold crown would be unsightly.

(5) Any kind of tooth may be used and placed at almost any desired inclination, or, at all events, in any position ordinarily met with.

(6) Should this crown be fractured it is an easy matter to grind off the remains of the tooth without injuring the cap beyond repair, and to fit on a Bonwill, or any other form of hollow crown, either temporarily or permanently, or any ordinary flat tooth might very quickly be fixed by bending the pins round the pin on the cap, and securing them with oxyphosphate until a more suitable time, when the cap could be easily removed and the new tooth fused upon it again.

I have had one case fractured which was due to the tooth having been overfused, and consequently weakened, but, as the patient was my brother, I fixed the crown and let it take its chance. It stood ordinary usage for six months, but was broken through the patient biting toffee with it. This you will admit was a very severe test. I ground the remains off the cap, and fitted and fixed upon it a Bonwill crown in thirty minutes.

These, gentlemen, are the chief points which I consider are in favour of the use of gum body in crown work, and which I trust you will freely discuss, as it is only by getting the opinion of others that we arrive at the true estimate of the value of one method over another, while at the same time I would ask you to remember that this kind of work has not been at all extensively practised, and consequently must have some imperfections. The chief reasons which have prevented many from trying it, would seem to me to have been the idea that gum body could not be easily fused, and possibly the difficulty experienced in getting a furnace which could be heated up quickly. I trust, however, that the time taken to bake the crown shown will convince you that it is neither a difficult nor lengthy undertaking with the little Injector Furnace.

British Journal of Dental Science.

LONDON, AUGUST 15, 1895.

MEDICAL CONCLAVES.

The British Medical Association has just held its sixty-third Annual Meeting in London, with an attendance of nearly 3000 persons, including 180 visitors. In reading through the many able addresses, communications, and discussions, we have found several points which should prove interesting to the Dental Surgeon. The polished, caustic, and yet philosophical address of the President, SIR RUSSELL REYNOLDS, contained references to the improvement in teaching, the use of loose phraseology in describing diseases, and the aspects of professional life. Mr. JONATHAN HUTCHINSON in the course of his address in Surgery, approached the question of specialism. He confesses that for years he has felt himself obliged to hand over patients, requiring certain operations, to other surgeons whom he considered were able to do the thing better than he himself. He, however, spoke designedly of specialists rather than of special hospitals, for when the staff at the latter is large, it is quite possible that the limited number of beds ceases to afford the advantages, as regards individual experience, which they are designed to do. On the other hand good specialists are sometimes developed quite independently of special institutions, and not only show remarkable skill themselves, but almost invariably make good teachers. Although always voting in favour of an extension of the curriculum, it has seemed to Mr. HUTCHINSON to partake too much of the faith that if a horse is only kept long enough at the water, he can be made to drink.

Perhaps some of the most pungent discussions took place at the General meetings of the members. Dr. WARD COUSINS, the President, in moving the adoption of the Council's Report, said that one matter, at all events, had been most carefully considered by the Parliamentary Bills Committee. This was the proposed amendment of the Medical Acts, which we know has created some excitement in dental circles. The speaker thought it was certain that when the right time came the whole force of the Association must be in the direction of modifying those Acts. "Nothing was more distressing than to see the sick and the suffering under the influence of fraud and injustice, and it was on public grounds, not merely as a matter of professional protection, but on general, broad, public grounds that they wanted the Medical Acts amended and reformed." The General Medical Council came in for some strong criticism during the discussion upon Dr. RENTOUL's proposal to increase the "direct representation" of registered medical practitioners. The speaker showed how, without increasing the whole number, five additional representatives should be chosen by England and Wales, and one each by Scotland and Ireland. This was vigorously supported by Sir W. FOSTER and Mr. WHEELHOUSE, two of the present direct representatives, and the resolution was unanimously adopted.

As an amusing antithesis to the deliberation of the great orthodox medical Association, we may record the fact that a few days previously there was a large gathering at Southport, of herbalists from various parts of the northern and midland counties. The National Association of Medical Herbalists of Great Britain, (Limited), was holding the thirty-first annual conference. Here also allusion was made to the proposed Medical Act Amendment Bill, and according to the report in the *Chemist and Druggist*, the Chairman claimed that they had stolen a march upon the framers of the Bill. One of the clauses was to the effect that no one should call himself a medical herbalist, but as the Association had recently become an incorporated body they would

be able to use their registered name. Several of the members mentioned the names of recently elected M.P.'s, who have promised to vote against any Bill which would treat medical herbalists unjustly. One thing seems certain, that unless the proposed Bill is introduced as a Government measure it cannot escape "blocking."

A DRAUGHT AFTER EXTRACTION.—From the *Western Gazette* we learn that Alice Clarke (described in the newspaper as a "Female Dentist," but whose name does not appear on the Register) has been charged at the Police Court with having maliciously and unlawfully administered a certain poison to a lad of sixteen. The latter said he went to the prisoner at the Royal Hotel, Radstock, under the impression that she extracted teeth without much pain. After the operation she gave him a glassful of some "dark stuff," and after paying the fee he commenced to walk home. He very quickly became giddy and was obliged to lie down by the side of the road. After reaching home and vomiting, he went to sleep and remained unconscious until 11 o'clock the next day. The doctor who was called found the lad unconscious and comatose; the pupils were contracted and insensible to light, and he used the stomach pump. He thought the fluid obtained was similar to chlorodyne, and the case was adjourned in order that an analysis might be made.

ANOTHER DENTAL ASSOCIATION.—According to a paragraph in the *Blackburn Telegraph*, a Dental Association has just been formed at Burnley. The objects are primarily to raise the status of the profession and to create a better feeling among the members. Membership is limited to *bona-fide* dental surgeons who are engaged in no other occupation, so that the Association will be quite of an exclusive character. At present the only districts proposed

to be taken in are Nelson, Colne, Barnoldswick, and Earby ; but when the Association has got into working order the radius will be extended. Preston has already its Dental Association, and Blackburn and Accrington dentists have thought of taking similar steps. The *Telegraph* asks, Why should not all these combine under the name of the East Lancashire Dental Association ?

THE CHILDREN'S TEETH.—At a meeting of the Cheltenham Board of Guardians, a conversation arose as to an examination of the children's teeth being regularly made, and we are not surprised to find that Dr. Pruen, the medical officer, expressed approval. It appears that a voluntary offer of service had been made informally, but on the Chairman's suggestion the Board thought this ought to be made more formally. This may be well for a beginning, but we strongly hold that for many reasons such posts should have a stipend attached.

FATAL HÆMORRHAGE AFTER EXTRACTION.—One of these fortunately rare cases has occurred in Dublin. The patient, a man, aged 40, went to a dentist by appointment between 12 and 1 o'clock in the day. Ether was administered by a medical man, and eight carious teeth were removed. The hæmorrhage after the operation did not cease as usual, and plugging, with hæmostatics, was resorted to. The remedies failing, additional medical assistance was obtained, but although transfusion was resorted to, the hæmorrhage proved too much, and the patient died the following morning. He had been suffering from indigestion for some time, and had been recommended to get his teeth attended to.

PROFESSOR MILLER.—We are glad to hear that Professor Miller of Berlin, has much improved in health. He is now "resting" in England, and as the guest of Mr. Howard

Mummery, is, we believe, practising Golf instead of Dentistry.

HYPOPLASTIC TEETH.—In the section of Diseases of Children, at the recent meeting of the British Medical Association, Dr. J. K. Barton read a paper on "The Relation between the Foods of Early Life, and the Condition of the Teeth in Youth and Early Adolescence." His communication really attempted to account for the condition, well-known to dentists, which is frequently to be noticed in the incisors and first permanent molars, and due to enamel defects. Adopting the Continental nomenclature, Dr. Barton termed this condition "Erosion," but this is a name applied by English Dentists to a totally different process. At the February meeting of the Odontological Society, Dr. Grevers, of Amsterdam, showed lantern slides of sections from teeth affected with these enamel defects, and, following Ziegler's definition of Hypoplasia, proposed to call such teeth "hypoplastic teeth," in consonance with the previous recommendations of Tsigmondy and Cunningham.

INFANT FEEDING.—Dr. Barton has been able to follow up a good many cases in which he had noted how the children were fed. In 202 cases there were 10 in which "erosion" was well marked in the permanent dentition, and 5 in which the temporary teeth were affected. He is of opinion that the condition is not due to any disease, but is caused by errors in feeding during the first nine months. If the child is fed properly for the first three years he holds that no sign of "erosion" will be present in the permanent teeth. Out of 67 hand-fed children the teeth were effected in five instances, whilst 24 fully breast-fed children were quite free. Oatmeal and skim milk are improper foods at such an early age, and no starch should be allowed before nine months; two of the worse cases had oatmeal. We hope to publish an abstract of Dr. Barton's paper when it appears in print, and to refer again to this interesting question.

REMAINS OF PROBOSCIDIANS.—French palæontologists are again in luck. The remains of several gigantic elephants have been discovered in the sandpit at Pilloux, in the Charente. An extraordinary ivory tusk nearly three yards in length is one of the “finds,” and close by were a smaller tusk, and several molar teeth. Remains of the mammoth, rhinoceros, hippopotamus, and buffalo were also found. Perhaps the most interesting part of the story is with regard to a fairly large number of cut flints which were mixed with the animal remains. According to a Paris newspaper, this is the first instance in which attention has been called to the existence of human instruments being found in conjunction with a contemporaneous species of elephant hitherto regarded as antecedent to man.

A VALUABLE TOOTH-PASTE.—No doubt our sailors need all the attention paid to their teeth which is possible, and here is an advertisement in Japanese-English which was widely circulated in English ships.

“In the Eest there was no good sanitary tooth paste was sure to cure and safe to use, so our campany resolved to prepare a good natural paste and succeeded.

The efficiencies of this paste are as following :

Firstly, to strengthen and preserve the nature of the tooth.

Secondly, to tight the tooth with thingams.

Thirdly, to defend a hemorhage arisen by frictrir.

Fourthly, to take away the offensive smell of the mouth.

Fifthly, to difent the putrification of tooth and so prevent the carious one.

Any one who uses this paste will certainly discover that it is of avery wor drful and valuable nature, by his practice.

To use this paste, it is necessary to vinse the mouth will walir aftr sabling the tooth carefully by the tooth brash.”

The *Daily Chronicle* remarks upon this that “A good-natured paste which has succeeded ought certainly to tight

the tooth with thingams, if not with thingambobs, and to prevent the carious one ; but how is it, however good-natured, to defend a hemorrhage however arisen ? And how is the tooth sabled ? Oh, mysteries of English as she is wrote !

TOMES' LECTURES.—Dr. Harlan in taking part in a discussion upon The History of the Progress of Dentistry, said :—It was in 1848-9 that John Tomes delivered the most brilliant course of lectures that had ever been delivered by any dentist in the world prior to that time, on Dental Physiology. The lectures furnish as good reading as any of the most modern works on physiology, barring the microscopical work that has been done and incorporated in the later text-books, such as Landois', Foster's, and other works on physiology.

THE MISSION OF THE MATRIX.—Dr. Hungerford considers the advantages of using a matrix for gold fillings are that it enables you to have a fourth wall upon which to condense your gold ; that it enables you more readily to separate your fillings ; that it does not necessitate an amount of undercutting and weakening of the cervical margin ; that it enables you to use less material, a less number of blows upon the tooth, so that there is less likelihood of fracturing the enamel ; and the filling, after it has been inserted, is in a more perfectly dense and more perfectly finished condition than if put in without it. The advantages in the saving of time and pain to the patient are also very considerable.

RUBBER DAM CLAMPS.—To adjust the rubber dam clamp painlessly, slip over its jaws small pieces of rubber tubing. These will also aid in making a water-tight filling around the tooth.—*Dominion Dental Journal*.

OBITUARY.

THE LATE SIR JOHN TOMES, F.R.S.

Shortly after we had gone to press with the last issue of the JOURNAL, the news came to hand that Sir John Tomes was no longer with us. Many of his friends knew that his weak condition had for some time caused much anxiety to his family circle, and the end came on Monday, July 29th. Sir John, who was in his eighty-first year, had retired from active practice for some years, but he had been mainly responsible for all that there is of good in British Dental Surgery, and to the end his advice was sought by those who have been associated with him in the past, and who attempt to carry on the work which he began.

Sir John Tomes was the first of his family to enter the medical profession, and it was during his term of office as House Surgeon at the Middlesex Hospital that he devised various shapes of dental forceps, each adapted for the extraction of particular teeth. When afterwards appointed Dental Surgeon to the same Hospital, he delivered a course of lectures which did much to place his speciality upon a scientific basis. But he worked also for his profession in other ways. It was due to his influence with the authorities of the College of Surgeons that, after several ineffectual attacks, that Body instituted the Licence in Dental Surgery. Some twenty years later Sir John Tomes was still active as a prominent member of the Dental Reform Committee, and steering a sound course weathered such rocks as "The Association of Surgeons practising Dentistry," and other impediments. The Dentists' Act of 1878 represents the best that could be obtained at that time and under the then existing circumstances, and it was due to

Sir John Tomes' hard work and personal influence that it became law. It is still a stronger one than the Medical Act, and, in spite of occasional unfavourable criticism, is likely to serve dentists for some time to come. Public opinion is not ready for a more stringent one, and it must still be a matter of surprise and admiration that Sir John and his friends were able to negotiate the Act of 1878.

It is too seldom that we find our leaders skilful both in Politics and Science, but Sir John Tomes set a good example. Apart from the benefit conferred upon his brethren by raising their social and professional status, it must not be forgotten that he did much from the purely scientific standpoint. The investigations which he carried out with Mr. De Morgan upon the development and structure of bone are well known, whilst the terms "Tomes' process," and "Tomes' fibril" sufficiently indicate to the students of Dental Histology the energy displayed in difficult scientific problems. Readers of the older literature of the profession cannot but be struck with the characteristics which successfully carried Sir John Tomes through certain periods of stress, and more or less stormy discussions at Commissions and Committees. He was one of the Founders and a President both of the Odontological Society and the British Dental Association. In addition to possessing the ordinary professional diplomas, Sir John was elected a Fellow of the Royal Society and of the Royal College of Surgeons. At the latter institution there is a Prize bearing his name, and testifying to the congratulations of his friends upon his Golden Wedding day last year.

The burial took place at St. Mary's, Upper Caterham, Surrey. The chief mourners were Mr. and Mrs. C. Tomes, Miss Tomes, Major-General Sibley, Dr. Knowsley Sibley, Mr. Holgate, and Mr. T. Atkins, and there were also

present Sir W. Flower, Sir J. Danvers, and a number of Sir John's professional friends and colleagues. Wreaths were sent by the Odontological Society of Great Britain, the Students' Society of the Dental Hospital of London, and the staff of the Dental Hospital.

Dr. Sibley writes to the *British Medical Journal*:—
It may be said of Sir John Tomes that his life was a truly consistent one, and everyone who knew him alike respected and admired the man. His views were of the broadest and most charitable. It would be difficult to imagine a more ideal home than Upland Gorse, presided over by Sir John's keen and in many respects unique intellect and Lady Tomes' courteous manner, combined with great musical talents, most fully appreciated by her husband. His was indeed a most appropriate crest and motto: "Nil sine Labore," and may be truly said to have been the keynote of his long and useful life.

Review.

Useful Hints for the Busy Dentist. By W. H. Steele, D.D.S. The Wilmington Dental Manufacturing Co., Philadelphia, 1895.

This is a book of nearly 300 pages, containing extracts from the various Dental journals, arranged in different "departments," such as Operative, Mechanical, Therapeutical, &c. The author has endeavoured "to present to the busy, practical dentist, the latest and best methods of our most skilled operators and best writers, arranged in such a manner as to be accessible at a moment's notice." Some of the extracts are accompanied by illustrations, and although we have come across some "old" clippings the volume contains an enormous amount of useful information.

Abstracts of British & Foreign Journals.

THE NEW DENTAL LAW OF THE STATE OF NEW YORK.

The following are the main provisions of the new law which is in force from the first of this month :—

Section 160. Licentiates.—Only the following persons shall be deemed licensed to practise dentistry :

1. Those duly licensed and registered as dentists in this State prior to the first day of August, eighteen hundred and ninety-five, pursuant to the laws in force at the time of their license and registration.

2. Those duly licensed and registered after the first day of August, eighteen hundred and ninety-five, pursuant to the provisions of this chapter.

Section 161.—State board of dental examiners.—On the first day of August, eighteen hundred and ninety-five, the State board of censors of the Dental Society of the State of New York, as the latter body shall be composed at the date of such appointment, shall become the board of State dental examiners. The existing division of said censors into four classes and their terms of office shall remain the same for the said board, except that said terms shall expire on the thirty-first day of July in each year. Before the day when the official terms of the members of any of said classes shall expire, the regents shall appoint their successors, to serve for the term of four years from said day. Such appointments shall be made for nominations made by such society from a list of nominees not larger than the number of the outgoing class furnished prior to the third Tuesday in May of each year by the State Dental Society, and no one shall be nominated or appointed, who is connected with the faculty of any dental school or college, but this shall not be construed as applying to the present state board of dental examiners until the terms of office for which they were last elected shall have expired. In default of such nominations, the regents shall appoint such examiners from the legally qualified dentists in the State belonging to the said State Dental Society. The regents shall also fill vacancies in the board

that may occur by death, resignation, or otherwise than by expiration of a term of office. All nominations and appointments shall be so made that every vacancy in the board shall be filled by a resident of the same judicial district in which the last incumbent of the office resided. The board shall convene at the call of the secretary of the regents within not less than two weeks after appointment and organise by electing, to serve for one year, a president and secretary. These officers shall be elected annually. No person shall be appointed an examiner unless he has received a dental degree from a body lawfully entitled to confer the same, and in good standing at the time of its conferment, and has been engaged within the state during not less than five years prior to his appointment in the actual and lawful practice of dentistry. Cause being shown before them, the regents may remove an examiner from office upon proven charges of inefficiency, incompetency, immorality or professional misconduct.

Section 162. Examinations.—The board, in connection with the regents, shall frame rules from time to time for the regulation of their own proceedings and for the examination of candidates for license to practise dentistry. But no person shall be examined by said board unless he be at least twenty-one years old, of good moral character, and shall receive a certificate from said regents that he has satisfied them by examination or otherwise, that prior to commencing his professional studies he had a preliminary education equivalent to that required of students entering the dental colleges of this State, which, after January 1st, eighteen hundred and ninety-seven, shall be not less than a full high school course; and either has been graduated in course from a registered dental school, or else, having the degree of doctor of medicine, has pursued thereafter a course of special study of dentistry for at least one year in a registered dental school, or holds a diploma or license conferring full right to practice dentistry in some foreign country and granted by some registered authority. Any member of the board may inquire of any applicant for examination concerning his qualifications and may take testimony of anyone in regard thereto, under oath, which he is hereby empowered to administer.

Degrees.—A person having lawfully received a dental degree in course from a registered dental school, or the degree of doctor of medicine from a registered medical school, and

having thereafter lawfully practised dentistry for the term of five years, may apply to the regents for the degree of Master of Dental Surgery, which degree the regents may confer after examination of the applicant by the board under such rules and regulations as the regents and the board shall frame. No degree in dentistry shall be conferred in this State on any candidate who has not before matriculation in the institution conferring it, filed the certificate of the regents that he has had a satisfactory preliminary education, which for those matriculating after January first, eighteen hundred and ninety-seven, shall be not less than a full high school course.

Licenses.—On certification by the board of dental examiners that a candidate has successfully passed the examination and is competent to practise dentistry, the regents shall issue to him their licence so to practise pursuant to the rules established by them. Upon the recommendation of the board, the regents may also, without the examination hereinbefore provided for, issue their license to any applicant therefor who shall furnish proof satisfactory to them that he has been duly licensed to practise dentistry in any State or country after full compliance with the requirements of its dental laws, and has been thereafter lawfully and reputably engaged in such practice for five years next preceding his action; provided that his preliminary and professional education shall have been not less than that required in this State. The regents may also license any applicant on the certificate of the board that after due investigation or examination it finds his education and professional attainments and experience of not less than five years in actual practice to be together fully equal to the requirements for license in this State. Every license so issued shall state upon its face the grounds upon which it is granted and the applicant may be required to furnish his proofs upon affidavit.

Registration.—Every person practising dentistry in this State and not lawfully registered before this act takes effect, shall register in the office of the clerk of the county where his place of business is located in a book kept by the clerk for such purpose, his name, age, office, and post-office address, date and number of his license to practise dentistry and the data of such registration, which registration he shall be entitled to make only upon showing to the county clerk his license or a duly authenticated copy thereof,

and making an affidavit stating his name, age, birthplace, the number of his license and the date of its issue, that he is the identical person named in the license, that before receiving the same he complied with all the preliminary requirements of this statute and the rules of the regents and board as to the terms and amount of study and examinations ; that no money, other than the fees prescribed by this statute and rules, was paid directly or indirectly for such license, and that no fraud, misrepresentation or mistake in a material regard was employed or occurred in order that such license should be conferred. The county clerk shall preserve such affidavit in a bound volume and shall issue to every licentiate duly registering and making such affidavit a certificate of registration in his county, which shall include a transcript of the registration. Such transcript and the license may be offered as presumptive evidence in all courts of the facts stated therein. The county clerk's fee for taking such registration and affidavit and issuing such certificate shall be one dollar. Any licentiate practising dentistry in any county of the State other than that in which he first registered shall in like manner register in the latter county also, and may do so upon presenting to the clerk thereof his certificate of registration from the clerk of the former county and the payment of a fee of twenty-five cents.

Examination fees.—Every applicant for license to practise dentistry shall pay a fee of not more than twenty-five dollars. From the fees provided by this article the regents may pay all proper expenses incurred by them under its provisions, and any surplus at the end of any academic year shall be paid to the society nominating the examiners to defray expenses incurred under the law.

Revocation of licenses.—If any practitioner of dentistry be charged before the regents with unprofessional or immoral conduct, or with gross ignorance or inefficiency in his profession they shall notify him to appear at an appointed time and place, with counsel if he so desire, before the board to answer said charges, furnishing to him a copy thereof. Upon the report of the board that the accused has been guilty of unprofessional or immoral conduct or that he is grossly ignorant or inefficient in his profession, the regents may suspend the person so charged from the practice of dentistry for a limited season or may revoke his licence. Upon the revocation of any license the fact shall be noted upon the

records of the regents and the licence shall be marked as cancelled of the date of its revocation. Upon presentation of a certificate of such cancellation to the clerk of any county wherein the licentiate may be registered, said clerk shall note the date of the cancellation on the register of dentists and cancel the registration. Any person whose license shall be suspended or cancelled shall be deemed, while such punishment is in force, an unlicensed person and as such subject to the penalties prescribed for other unlicensed persons who practise dentistry.

Section 163. Construction of this article.—This article shall not be construed to prohibit an unlicensed person from performing merely mechanical work upon inert matter in a dental office or laboratory, or a licentiate from assisting his preceptor in dental operations while in the presence and under the personal supervision of an instructor, or any duly licensed physician from treating diseases of the mouth or performing operations in oral surgery. But nothing in the provisions of this article shall be construed to permit the performance of dental operations by any unlicensed person under cover of the name of a registered practitioner. Any student of dentistry whose certificate of study under private preceptorship shall have been duly filed with the secretary of the State Dental Society at the time this act takes effect pursuant to the provisions of law then in force, may present himself for examination to the board under the same conditions as those under which he might have presented himself for examination before the censors of the State Dental Society under the laws in force when his certificate was filed ; providing however, that he shall file a notice with the regents on or before the first day of September, eighteen hundred and ninety-five, that he purposes availing himself of this exemption.

Section 164. Penalties.—(a) A person who, in any county of the State, practises or holds himself out to the public as practising dentistry, not being at the time of said practice or holding out a dentist licensed to practice as such in this State and registered in the office of the clerk of such county pursuant to the general laws regulating the practice of dentistry, is guilty of misdemeanour, and punishable upon conviction of a first offence by a fine of not less than fifty dollars, and upon conviction of a subsequent offence by a fine of not less than one hundred dollars, or by imprisonment for not less than two months, or by both such fine and

imprisonment. Any violation of this section by a person theretofore convicted under the then existing laws of this State of practising dentistry without license or registration shall be included in the term a subsequent offence.

(b) A person shall be deemed guilty of a misdemeanor, and upon every conviction thereof shall be punished by a fine of not less than five hundred dollars or by imprisonment for not less than six months, or by fine and imprisonment, who

(1) Shall sell or barter or offer to sell or barter any diploma or document conferring or purporting to confer any dental degree or any certificate or transcript made or purporting to be made pursuant to the laws regulating the licence and registration of dentists ; or,

(2) Shall purpose or procure by barter any such diploma, certificate or transcript with intent that the same shall be used as evidence of the holder's qualification to practice dentistry, or in fraud of the laws regulating such practice ; or,

(3) Shall, with fraudulent intent, alter in a material regard any such diploma, certificate or transcript ; or,

(4) Shall use or attempt to use any such diploma, certificate or transcript which has been purchased, fraudulently issued, counterfeited or materially altered either as a licence or colour of licence to practice dentistry or in order to procure registration as a dentist ; or,

(5) Shall practice dentistry under a false or assumed name ; or,

(6) Shall assume the degree of bachelor of dental surgery, doctor of dental surgery or master of dental surgery, or shall append the letters B. D. S., D. D. S., M. D. S. to his name, not having had duly conferred upon him by diploma from some college, school, or board of examiners legally empowered to confer the same, the right to assume said titles ; or shall assume any title or append any letters to his name with the intend to represent falsely that he has received a medical or dental degree or license.

(c) Any person who in any affidavit or examination required of an applicant for examination, license or registration under the laws regulating the practice of dentistry shall make wilfully a false statement in a material regard shall be guilty of perjury, and punishable upon conviction thereof by imprisonment not exceeding ten years.

(d) All fines, penalties or forfeitures imposed or collected for violations of the foregoing provisions relating to dental

practice and the corresponding sections of the penal code must be paid to the State Dental Society. Said society may prefer a complaint for violation of the law regulating the practice of dentistry before any court, tribunal or magistrate having jurisdiction, and may, by its officers, counsel and agents aid in presenting the law and facts before such court, tribunal or magistrate in any proceedings taken.

INFLUENCE OF LOCAL EXERCISE ON THE TEETH.

By SIDNEY S. STOWELL, D.D.S.

Some years before I became interested in the science of dentistry, I observed a man past fifty years of age, who had the most beautiful set of ivory-white teeth I had ever seen; and being curious to know why he had been so blessed, I asked him the reason. He told me he had "chawed" gum incessantly from his earliest recollection; and as he was "chawing" when he said this, and was never at rest from the habit when I saw him at other times, I have reason to give credence to his statement as to his "chawing," and the cause of the fine set of teeth. Though an ignorant man, he remarked to me at the time that the habit kept his teeth clean and gave them exercise. Like the Romans, he "builded better than he knew."

Another case. A man forty years of age, an excessive meat-eater, beefsteak preferred, and three times a day not too often, being in moderate circumstances, other than tenderloins have been served at his table, and oftener that which grew very near to the bull's hind leg; and yet with a strong, clean, white set of nature's mill-stones he ground to a pulp his sweet morsel of beef, fitting it for a perfect digestion in a healthy stomach. He knew not the use of a toothbrush or powders, nor had he any use for the dentist, and yet his perfect set of pure white dental ivory might well be the envy of any one. This man had two sisters whose teeth were completely lost by decay, making extraction of the roots and insertion of an artificial denture a necessity before

the age of eighteen years. The girls ate white bread, pies, cakes, and candies, with the inevitable result.

Another case. A patient brought two children, three and five years of age, belonging to different branches of the same family, parents on both sides having good teeth, but the children's teeth were all blackened and entirely absorbed by decay to the gum-line; and yet the children in appearance were perfect pictures of health. I asked what the children ate, and was informed that they had been weaned early, and since that time had eaten absolutely nothing but Mellin's Food and malted milk. My explanation was ready before she had finished speaking. The children had *never used their teeth*. I said if those children had never used their legs they would be withered, and they could not now walk.

Another case. A gentleman who had been my patient six years ago has since married and has a child four years old, and remembering that I told him the teeth should have exercise to keep them strong, put the suggestion into practice by furnishing 'educator crackers' in quantity sufficient for his child to play with and build houses of. From the first day the child could put his little fist in his mouth he was furnished with these hard crackers, and upon them he exercised his jaws and cut his first teeth, consuming several crackers in a day, until at the age of four years the child was fond of the hard educators, and could easily bite one in two and grind it to powder with a perfectly strong and sound set of teeth. The child used his teeth, and they were retained for such use. Facts are stubborn things, and in view of those recorded I cannot too strongly urge the importance of *local* exercise in the preservation and maintenance of the human teeth.

There are people now living who can tell of the time when dentistry was almost unknown because little needed, while to-day there are twenty thousand dentists in the United States alone. When men used to eat largely of meat, tearing it from the bone and chewing it, eating with it coarse bread made from coarsely ground corn and wheat, they had use for their teeth, and they were retained for such use; but with the invention of meat-cutters and concentrated preparations of finely-ground and bolted wheat flour, pies and cakes, cookies softened in tea, soups and jellies, and the other foolish, useless conglomerations called food, Nature finding

no further use for the teeth proceeds to eliminate them, while an army of so-called intelligent men, twenty thousand strong in this country alone, take up their weapons against her. Year after year the great conflict goes on. Colleges and schools of learning are established which furnish many hundred recruits each year to swell this mighty army, which is fighting against nature and the inevitable, and shall we be victorious in the end? I say, no! not to the end of time, until we strike at the root of the matter and teach the people what to eat and how to eat it. We do not cure a headache by administering an opiate: though the pain may for the moment be relieved, we have not treated the cause; nor do we cure a sore by covering it with a plaster; nor have we done our whole duty when we fill a cavity of decay in a tooth when it is discovered. We have only repaired the damage for the moment, and the patient is left exposed as before to the same misfortune. We have given them many "*pounds*" of cure, but not an ounce of prevention.

The marked deterioration of the human teeth can be dated back to the time of the opening of the great wheat countries of the west, with the great flouring-mills which followed, and the consequent abundance of finely-ground and bolted wheat flour, which at one time was so rare that only the rich could afford the luxury, while for the last decade it has become the cheapest and most used of any article of food, bringing with it havoc and devastation to the teeth of an innocent people who knew not what they did; nor do they realise it at the present time, as we still find white flour the staple article of food among all civilized races. It furnishes the bulk and body of all fancy pastry cooking, as well as the entire constituent of that all-important and time-honoured food held in reverence above all others, and which always remains as the last morsel in starvation, *the loaf of bread*.

The Dental Cosmos.

GUAIACOL AS A LOCAL ANÆSTHETIC.

At the Academy of Medicine, Dr. Lucas-Champonnière called attention to the accidental discovery of the analgesic properties of guaiacol by his assistant, who being engaged in researches on that body, had inadvertently burnt his hand, and lacking the usual remedies, made an impromptu dressing with an ointment of guaiacol. The anæsthetic effects were so marked that he decided to make further investigations, and after numerous experiments arrived at the conclusion that an oleaginous solution of guaiacol, employed subcutaneously, was as pronounced in its anodyne action as cocaine; applied in dental surgery it gave results which he considered were superior to those obtained from cocaine, even in the presence of abscesses. It has been also successfully employed in minor surgery, three or four punctures being necessary, and a period of five or six minutes being allowed to intervene between puncture and operation. Slight gangrene of a benign nature occurred, but never were those accidents observed which occasionally happen with cocaine. In reply to a member of the Academy who criticised Dr. Lucas-Champonnière for not having also tested its action on animals, he stated that he considered that the sensitiveness of the latter was inferior to that of human beings.—*Pharmaceutical Journal*.

TO CLEAN AND POLISH ALUMINUM.—Sheets of this metal are rendered beautifully white by dipping them first into a strong solution of caustic potash and afterwards into benzine; the latter removes all dirt and grease. When thus cleansed, they are plunged into a bath of 2 parts of nitric acid to 1 of water, next into strong nitric acid alone, and finally into a mixture of equal parts of vinegar and water. They are then carefully washed in pure water, and thoroughly dried in hot sawdust. A very brilliant lustre may be imparted to objects of aluminum, with much rubbing, by immersing them in an emulsion produced by shaking together equal parts of olive oil and rum.—*The Busy Dentist*.

RECURRENCE OF DECAY AT THE CERVIX.

By PROF. J. FOSTER FLAGG.

You all admit that recurrence of decay at the cervical border gives you the greatest difficulty to surmount, and as yet you have not reached the cause nor the remedy. It must be admitted that if this one thing can be mastered, we have overcome our most powerful foe.

It is a fact not to be denied that every dentist cries out for some method to prevent recurrence at the cervix. Every one must admit that contour fillings have been the only help or partial cure, though it has to be repeated or requires patching.

A case presents where caries has run wild. Not a proximal surface scarcely but is involved. No pulps quite exposed, but threatening. Every tooth has been filled and refilled, and by more than one dentist. Contour has been attempted. Where the fillings of gold remain they are so undermined there is nothing but utter annihilation unless all are removed. The teeth from their loss of proximate surfaces are all out of articulation, which can be best seen by taking an impression and putting the casts in an articulator. Look closely at the cervix, and you will find the root of each so close that no thread can be forced through and the decay is far up under the cervix. Look further and probe for the alveolar process, and not a vestige of it remains for a quarter of an inch up. Look also to the second molar where the first has been extracted, and on that side the process has gone far down and nothing but loose gum tissue remains, and is constantly receding, and wherever a tooth has been lost the process about the cervix absorbs as the body of the jaw absorbs.

In this state of affairs you put on your dam and separator, and you obtain a slight widening, and at once fill permanently the excavated tooth. No attention is paid to the articulation of the teeth. The rest of the teeth are left without anything in them, till one by one you have had your patients at least twice a week for months, two hours or more at a sitting, till they are exhausted and condemn dentistry, and while you are rushing through to complete every cavity with a filling, you have done nothing to prevent further and rapid decay, and pulps become exposed and patients have to suffer. You can do better than this, and not only retain

your patients, but bridge over time as well as space, and fill at your leisure.

I will take the same mouth just illustrated, and without placing in one single permanent filling of any kind of metal, treat it with pink gutta-percha alone, with a little of the white as a facing, where necessary. I cut out only partially the cavities on one side of the jaw, always exposing every grinding surface where the proximal is gone, and make compound by running all of the cavities in one, seldom leaving any proximal cavity to stand alone, but opening it in the grinding surfaces. This is a cardinal principle with me. There is one surface or border I complete at once, and that is the cervical, so that I never have to touch it again, and this I cut so far up as to not only remove all caries, but where I know the gum and process will grow up and over it. This is finished, and to enable me to do so I forgot to say, I never put on the rubber-dam in any case till I fill permanently, when the cervix is firm and will admit of its adjustment. It is easy to stop the blood with perchloride of iron, creasote, or any styptic.

And now for the further treatment. In all the spaces I have made I place great pieces of pink gutta-percha, and with no separation between them stuff the whole intervening space, trim and let alone. This I do till every place is filled in. I dismiss the patient, and have him call in three or six months or a year, as I may please; and, as I find the teeth wide enough apart for a plus-contour filling, and the alveolar gum border and process is in perfect health, and the process has grown up to the gutta-percha, then I fill only those that show that they are wide enough apart at the cervix to permit a healthy, full process to grow that the gum will have proper substance, and cleave to the root and cover up and over the margin of the filling at the cervix. In this is your future security at the alveolar border.

No one has ever called attention to the difference in width of the proximal spaces at the cervix for the bicuspid and molars. The gutta-percha should remain in till double the width or space is gained between the molars than the bicuspid, on account of the greater size of the molars, where more proximal surface is in contact and no room left for cleansing unless the spaces are very much greater than normal, and the contour made to suit this issue. Here is where you will say, "You will destroy the articulation and cause greater strain on

the filling and teeth." No, you are mistaken. When the whole of these proximal surfaces are filled with the semi-elastic stopping, and the act of mastication set up, the teeth that at first are out of the normal position, and only touch on part of their crown surfaces, are now allowed to re-adjust themselves, as the gutta-percha will give where the greatest pressure is brought to bear, and where least resistance is offered, no change occurs.

This method is a test for any further treatment, which, if needed, can so easily be done. It permits of weeks, months, and years before the permanent filling need be introduced. No danger of decay, none of loss of structure from fracture, and, in fact, you can dismiss the patients thus treated with the greatest indifference as to the issue.

Thus I practice with all ; and I am happy in this, knowing that I do far more good, am not troubled about immediate root filling,—fillings falling out,—“conservative treatment of dental pulp.” Nor does pyorrhœa ever invade on my domain of original work, because I know the value of articulation, and how to make every tooth perform its individual and collective function, and no improper pressure given it to press or work its life out of it and give rise to the denudation of the periodontal membrane ; nor is the food ever found pressing up in the cervical border and remaining, nor the cervix so weakened by want of contact with firm alveolar processes, and the gum is left to hug the root at this vital portion so tightly that nothing ever creeps in to cause recurrence.

Any dentist who allows his original patient who follows orders to have pyorrhœa should be sued for damages. See that no food presses on the gum border ; see that no tooth is improperly pressed and contorted by false articulation, caused by improper width and contouring ; allow no biting of threads, cracking of nuts, biting of ice on one tooth only, or, when a tooth has been lost, see that the articulation is restored, and, gout or no gout, syphillis or disease, pyorrhœa will not come, except from filth and malaise of one or more teeth.

Gutta-percha used as matrices for gold, amalgam, or oxiphosphate fillings I will not dwell on ; you need nothing better. For holding teeth in position after correction where there are cavities in both, I need only mention it. As for assistance on the temporary and permanent teeth, to keep the ligature from slipping down on the cervix by carrying the ligature through it ; for fastening pins in roots for crowns ;

as a medium between crowns and roots to prevent further caries; as a protection to all roots when a gold crown is used; and, in fact, as a factor in our practice, there is nothing to fill its place.—*International Dental Journal*.

ALUMINUM AS A BASE FOR ARTIFICIAL DENTURES.

BY E. R. JOHNSON, D.D.S., Buffalo, N.Y.

Aluminum has been used in dentistry for about twenty-five years, but, owing to its many peculiarities its employment has been circumscribed. Like amalgam it has had its up and downs, and like amalgam it is here to stay. The many "downs" which it has received have caused the large majority of dentists to give it a wide berth, but the recent production of pure aluminum has done away with the old cavil that it disintegrates in the mouth, and a new trouble has appeared upon its horizon. It is urged that the metal is soft and very pliable after it is swaged. It is concerning this objection that I wish specially to speak. Improper annealing is the usual cause of soft, pliable plates, the usual method being to coat the metal with sweet oil, then to hold it in the flame of a Bunsen burner until the oil has burned off, when it is immediately plunged into cold water. This softens the metal, but leaves a surface tension which is objectionable at this stage of the manipulation, for it makes a re-annealing necessary before the swaging is finished. This again softens the metal, and as it has already taken on the shape of the intended plate, there is not enough swaging and manipulating to be done to temper it again, while if it is not annealed the metal becomes so rigid that perfect adaptation and the avoiding of wrinkles in the plate are almost impossible.

The surface tension is accounted as follows: Before annealing the metal the crystals are all elongated by the rolling of it into sheets. When the metal is heated for the annealing, the crystals tend to assume their original molecular arrangement, but when the metal is plunged into the cold water the molecules become stretched in taking their normal position,

so that the outer surface or the outer layer of the crystals has assumed this surface tension.

Another proof that the molecules change positions and shape, can be observed if one will try the metal in a gauge before and after annealing. If it is twenty-four before annealing, it will be twenty-five afterwards. If one would avoid this surface tension, he should be more careful about annealing and swaging. After the metal has been coated with oil, and this burned off in the Bunsen flame, it should be allowed to cool down gradually. It will be found that it takes some time to do this sufficiently to permit handling, but if it be carefully attended to it will permit a perfect molecular arrangement, and it will be found that the metal is much softer than when annealed in the old way. It will also have increased in thickness from a twenty-five gauge to a very tight twenty-four.

In swaging the metal the palatal portion should be swaged first. This can be most easily done by banking the die with moulding sand up to the ridge, and simply making a counter die of the palatal portion. Swage from this, and then hammer the metal over the ridge into place as nearly as possible. It will be found that it works very easily, and that wrinkles are handled with the utmost ease. After it is well beaten to place, a new counter die is run, as in the ordinary way. Finish swaging from this. It will be found that the metal is very materially condensed between the die and the counter die. Another reason why the metal is found too soft, is that the vulcanizing is done at a point that is too high. A temperature of 350 deg. will soften the metal. Where vulcanizing is done at 320 deg., the inside of the vulcanizer will be at least 340deg. and should the vulcanizer run up a few degrees above 320 deg., as is often the case, the metal will come out soft. The vulcanizing should be done at 300 deg. for an hour and thirty minutes.

The Dental Practitioner.

DENTISTS' RELATIONS NOT CONFIDENTIAL.—During the trial of the case of S. J. de France for forgery, the defence attempted to raise a question of identity, for which purpose they showed that the teeth of the accused were entirely different from those of the person committing the forgery as alleged. In rebuttal, a dentist of Detroit was cited who testified that subsequent to the date of the forgery he had

inserted three false teeth in place of two incisors for De France. The Supreme Court affirmed the verdict of conviction and held that the terms "dentist" and "physician or surgeon," as the latter are used in the statute covering this point, are not interchangeable and that a dentist's relations with his patients can not be considered confidential as is the case with a physician or surgeon.

The Dental Digest.

Not long since John R. Mullen, of Alexander, Genesee County, N.Y., advertised for sale a diploma that belonged to his late father, and which was issued by the Castleton Medical College, of Vermont. The matter was referred to the Board of Regents of the University of the State of New York, and they have commenced proceedings against Mullen for infraction of the law, which makes such a thing a misdemeanour. During the investigation it has been discovered that there had existed a regular traffic in such diplomas.—*The Dental Practitioner.*

Dental News.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

During the July Examinations the following gentlemen passed the first Professional Examination for the License in Dental Surgery :—Robert John Shiach, Elgin ; Ruby Grace Halliday, London ; Thomas Roger Dove Walkinshaw, Newcastle ; Herbert Percival Friend, Yorkshire ; Charles Linnæus Routledge, Exeter ; Richard Mason, Edinburgh ; and Samuel Homer, Stourbridge ; and the following gentlemen passed the Final Examination and were admitted L.D.S. Edinburgh :—Alexander Crerar, Edinburgh ; Thomas Alexander Mackintosh, Edinburgh ; George Paterson, Belfast ; William Forsyth Tulloch, Elgin ; Alfred Lamyman, Middlesbrough ; George Crichton, Perth, Thomas Saunders Robertson, Kirkealdy.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH

The following were the questions in the written portion at the recent second dental examination.

GENERAL MEDICINE AND SURGERY AND SPECIAL DENTAL SUBJECTS.

VI.

Practice of Medicine.

Two questions, of which One is to be answered, and no more.

1. What is the therapeutic nature of Narcotics, Sedatives, Tonics and Stimulants, and give an example of a case fitted for each form of remedy?

2. What is the nature of Albuminuria ; what are some of the secondary affections and complications apt to occur in such cases ?

Surgery.

Two questions, of which One is to be answered, and not more.

1. Describe in a general manner the operation of Tracheotomy, and mention its chief difficulties and dangers.

2. What are the causes, symptoms, pathology, and possible results of Inflammation in a long bone ?

Dental Anatomy and Physiology.

Three questions, of which Two are to be answered, and not more.

1. What is peculiar in the dental formula of the Rhinoceros? Describe the incisors, upper and lower, and the molar teeth.

2. Describe fully the anatomy of the Antrum, with the variations to which its cavity is liable ; and give the chief points of difference between the antrum before the commencement of the second dentition and that of the adult jaw.

3. Describe the dental structures met with in the foetal and adult Whalebone whale.

Dental Surgery and Pathology.

Three questions, of which Two are to be answered, and not more.

1. What are the peculiar constitutional conditions which may occasion or accompany the Hæmorrhagic diathesis? What local and constitutional measures would you adopt on its manifesting itself after tooth extraction?

2. Describe the different forms of the lesion in Cleft and in Perforate palate. What are the functions which such lesions interfere with in infancy and adult life, and what would regulate your mode of treatment?

3. Under what circumstances would you consider it expedient to fix a Plate mounted with more than one Tooth by Pivoting, and what steps would you take to secure the best result.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents]

THE TEETH AND CIVILIZATION.

To the Editor of the "British Journal of Dental Science,"

Dear Sir,—I have been much interested in Professor Allen's communication to the JOURNAL upon the "Teeth and Civilization." He has well put what was in the minds of many, and in a forthcoming publication on "The Diseases of Children's Teeth" (advanced pages of which I have had an opportunity of seeing) will be found a reference to the same point. In dealing with the causes of Caries, the author says,—“By taking a comprehensive view it will be seen that these two classes of predisposing causes can re-act one upon the other, for bad structure may lead to loss of teeth, imperfect nutrition, and, as a more remote effect debased offspring; whilst on the other hand, it becomes manifest that an artificial interference with the survival of the fittest may result in depraved structure of the teeth in succeeding generations.”

I am, yours &c.

SIDNEY SPOKES.

Dental Hospital Reports.

WORK DONE at the Victoria Dental Hospital of Manchester,
during the month of July, 1895.

Number of Patients attended	1023
Number of Extractions	789
Number of Extractions under Anæsthetics	148
Gold Stoppings	59
Other Stoppings	116
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	290
Crowns	3
Irregularities	21
Total	1426

J. BUTTERWORTH, *House Dental Surgeon.*

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
6. The Journal will be supplied direct from the office on PREPAYMENT of subscription as under:

Twelve Months (post free) 14s. od.

Post-office Orders to be made payable at the Langham Place Hotel Office, to G. E. Sklirios, 289 & 291, Regent Street, W. A single number sent on receipt of seven (peny) stamps.

British Journal of Dental Science.

No. 663. LONDON, SEPT. 2, 1895. VOL. XXXVIII.

THE IMMEDIATE TREATMENT OF IRREGULAR TEETH.*

By GEORGE CUNNINGHAM, M.A., L.D.S. Eng.,
D.M.D. Harvard.

In the last quarter century orthodontia has made as solid progress as any other branch of the art and science of dentistry, and can boast of a literature in the works of Kingsley, Farrar, Talbot, Guildford, Angle, Case and Jackson, which places at the command of the young student of to-day an almost embarrassing choice of regulating appliances, most of them altogether unknown to his predecessor of not twenty years ago.

Despite the ingenuity and efficacy of these newer methods and appliances, the treatment still extends over a period of several weeks, or more frequently months.

This question of time, involving as it does that of cost, is a factor of fundamental importance, as the majority of irregular dentures still go untreated, while the unremunerative nature of the work to the practitioner except in rare cases is proverbial. It is evident therefore that a method which involves but a short operation of often but a few minutes, merits thoughtful consideration, and as sufficient time has now

* Read before the Odontological Society of Great Britain.

elapsed to prove the satisfactory nature of cases treated surgically or by luxation, the immediate method can be confidently recommended as worthy of judicious application in certain cases.

The records of this Society show that the operation of torsion for the rotation of upper incisor teeth has been completely successful in a sufficient number of cases to warrant its adoption in cases where the patient is unwilling or unable to take advantage of the slower and more certain method of rotation by mechanical appliances. In my own practice I have always adopted slow rotation by mechanical means as the safer treatment in such cases. The fact, however, that "torsion" has been successful, coupled with the knowledge of the extraordinary repair which takes place in cases of fracture of the jaw, even when accompanied by complete dislocation of the teeth, induced the thought—why not in cases of irregularity, produce an artificial fracture of the alveolus, and expect similar repair after rearranging and fixing the teeth in a regular position? I determined therefore to test this method in certain cases of irregularity where the ordinary treatment was not applicable. The opportunities for such experiments were not frequent in private practice, and progress was slow, as results of moving single teeth had to be awaited before daring to move several teeth. The improvement in the method of conducting the operation, the nature of the accidents likely to occur as well as the mode of their control, and the kind of cases where this method seems most applicable, will appear from the photographs and history of the cases, to which I shall now call your attention.

The first slide represents models of my first case of luxation which dates from July 29, 1886. The right upper molar, very extensively decayed, was quite close to the first bicuspid, whilst the second bicuspid was rotated on its long

axis, and completely outside the arch projecting towards the palate, thus interfering greatly with the patient's speech. After removal of the molar, by means of ordinary forceps with suitably guarded beaks, the bicuspid was forcibly rotated on its axis and pushed into the position of the extracted molar. On examination a year later, the tooth was somewhat loose, and the pulp was evidently no longer alive. Through a carious cavity entrance was obtained to the pulp cavity, the pulp *debris* removed, and the root canals and cavity treated in the usual manner by the immediate method. On examination some four months later the tooth was found to be much firmer, and in 1892, more than six years after the operation, was reported as doing well. As the patient promised faithfully to send me the tooth when it came out, I believe it may be still in position.

The next slide represents the case of an undergraduate, age 22, who desired extraction of two upper cuspids occupying a very irregular position within the palate, and the application of an artificial denture. On November 14, 1888, the right upper cuspid was luxated into position and retained by thin platinum wire and silk ligatures. On the following day the tooth was already discoloured, probably from rupture of the blood vessels of the pulp. On December 3 following, the left upper cuspid was similarly treated.

Just a month after the first of the operations the tooth was insensitive to thermal tests. On trephining the pulp, it bled freely, but was quite insensitive to the nerve instruments except towards the apex. The tooth was filled in the usual manner, and is reported now, more than six and a-half years later, as firm but discoloured. The left cuspid remained firm without discolouration for more than three years, but though it had later to be treated in a similar way to its fellow, it also still remains firm. With the improved methods

of operation now employed, I believe even the discolouration from the loss of the pulps might have been avoided.

The next series of slides represents different views of a case in which five teeth have been luxated, thus rectifying an irregularity on the left side of the mouth by which both speech and appearance were very materially affected. The left upper molar was very badly decayed, and was extracted to give space for the rearrangement of the five anterior teeth. The patient having been anæsthetised (nitrous oxide and ether), the molar was extracted, and after fracture of the alveolus between the teeth both bicuspid were luxated backwards by means of Physick's forceps. The cuspid and lateral incisor were similarly treated, all of them without detaching the teeth from their sockets. On endeavouring to luxate the central incisor, owing to a curved and distorted root, it slipped down between the beaks of the forceps, and although not removed from the bleeding socket, was practically extracted. As far as the curvature of the root would allow, it was forced into a fairly normal position. The teeth were ligated with thin platinum wire, and the parts painted with styptic colloid. The mouth was washed freely with an alcoholic solution of saccharin both before, and at least hourly, immediately after the operation. About three weeks later the ligatures were removed. As this patient is present for inspection, you may satisfy yourselves that, more than three years after the operation, all the teeth are sound, show not the slightest change in colour, and respond perfectly to thermal tests, although two at least of them were moved more than the length of their mesio-distal coronal diameters backwards, and the central incisor was completely dislocated from its socket.

The next case is very similar—extraction of the left upper molar, and luxation backwards of the two bicuspid, cuspid

and lateral incisor. Two years and eight months afterwards the patient reports that the four teeth are doing well, and are all as firmly fixed as before the operation.

The next series of slides represents a case somewhat typical of a not uncommon irregularity found in adult life. The patient was aged 36, and required bridge work or artificial dentures. The utility of any such appliances is manifestly and seriously diminished should some one tooth so interlock that the natural free movement of the jaws on one another is materially restricted. Two incisions with a circular saw revolved in the dental engine were made on each side of the left upper lateral incisor, which was then easily luxated into its proper position in the arch, and ligated as in previous cases. No anæsthetic was used, and the whole operation was completed in a quarter of an hour. Two and a quarter years after, the tooth presents a perfectly normal appearance.

Another series of slides shows the similar and equally successful treatment of an upper right first bicuspid, also the simple and excellent method of splinting such a case by means of two platinum ferrules soldered together.

A further series of slides represents some preliminary studies on the plaster cast with a view of showing the application of the method to other forms of irregularity in the adult, but where the patient or his family dentist discountenanced the operation.

Other cases might be narrated, but these will suffice to show all the difficulties and the range of possible failures. With experience has come an improvement of operative methods, which will prevent the recurrence of many earlier failures. It is possible in most instances, by the circular saw and improved alveolar dividers, to move the tooth bodily with its periosteal and osseous investment, thus preventing

unintentional extraction and auto-implantation, and in most cases subsequent death of the pulp.

The method of Dr. Bryan, of Basle, who simultaneously with myself presented a paper on this subject to the American Dental Society of Europe in 1891, consisted in "either partially cutting away the thick intervening alveolus with drills and long fissure burs; or when the alveolus was thin, bodily wedging the outer alveolar wall away with a half round wedge-shaped chisel, by inserting the point of the instrument between the tooth crown and the bone, and forcing it up along the root until enough space was secured for the tooth to be brought into place outside the lower tooth." Since my communication to the World's Columbian Dental Congress in 1893, he has modified his method to more nearly approach the sawing modification which I suggested by cutting half way through the septum on each side of the tooth with a circular saw.

You will have noticed that so far all the operations have been performed upon the upper jaw. In discussing this operation with Mr. Treves, he expressed surprise that I had not begun with the lower jaw. He thought that the operation, from the character of the osseous tissue and the blood circulation would yield better and more permanent results in the lower than in the upper jaw. However that may be, the new operation would be of relatively little value if good permanent results were not obtainable in the upper jaw from the much greater frequency of irregularities there. I have only had one opportunity so far of operating on the lower jaw, under what I now know to be suitable conditions.

In the mouth of a healthy undergraduate, aged 21, the first lower molar, of which only the roots remained, was abscessed, and the second lower bicuspid was functionless from its being so twisted inwards that the masticating surface

presented towards the tongue. On March 12, 1894, the molar roots were extracted, sawcuts made through the alveolus as deep as the saw ($\frac{7}{8}$ in.) would permit on the mesial and distal surfaces of the bicuspid, and the tooth raised from an angle of about 45 deg. to an upright position. Part of the crown was disked and the root fixed with a double matrix splint. No anæsthetic was used, and the patient reported that the saw cuts did not hurt so much as the moving of the tooth and segment of bone, but the pain quickly subsided. The movement of the tooth required very considerable force, and from an ominous sharp click at the finish I suspected that the end of the root had been fractured in the socket. On dressing the case on the following day in the usual way, the patient reported his condition as quite comfortable. On the eighth day the splint was removed, and next day the crown was disked for the reception of a gold ferrule. On the fifteenth day, in excavating a carious mesio-coronal cavity which extended to the pulp, it was found that the pulp had shrunk in its chamber and was insensitive. Root canal treatment followed, and on the twentieth day a bridge, consisting of a gold cap on the bicuspid, connected by a masticating bar to a platinum gold anchorage inlay in a coronal cavity of the second molar was cemented in place. Fifteen months after the operation the case was examined, when it was found that the bridge was firm and doing good service in mastication, and the surrounding parts quite healthy.

Re Instruments.—It is evident that much may be done by ordinary instruments at every one's command, but it is also clear that improved, specially adapted instruments are advisable. Dr. Bryan's forceps seem to me to be only of limited application, and in certain cases are not as good as the ordinary forceps. Dr. Aguilar, of Cadiz, has introduced a modification of Bryan's forceps which, as I understand, is a

combination in one instrument of the forceps and the fulcrum or alveolar support. Improved forms of mandrels, with a square shoulder for enlarged circular saws, thin, but not so thin as to buckle, are required. Perhaps as generally a useful instrument as any would be a new alveolar separator, a kind of combination of the Physick's forceps, which is primarily a double elevator, and the ordinary surgical bone forceps.

Re Conditions of Operation.—No such operation should be conducted in an unclean mouth, therefore all the tartar should be removed, the gums should be in a healthy condition, and all carious cavities excised and filled before undertaking the operation. Beware of giving demonstrations of the method unless you are absolutely sure of every operative detail, as you may take your circular saws and be provided with an engine which leaves you helpless. Direct action are much better than cable engines for such an operation.

Re Movement of the Apex of the Root.—It is clear that in many, if not most, of the cases narrated the apex has been moved. It should be noted, however, that in the later cases the aim has been to move the tooth in its socket, or the major portion of it, with all its connections, periosteal and osseous, nervous and circulatory, relying on the well-known facility of repair in bone.

In certain cases, inasmuch as the nerves and blood-vessels to a tooth are not in a state of tension, but rather loose or slack, it is quite possible that the apex of a root may be moved without actual severance. It may be remarked that all the teeth operated on so far have either been moved outward or backward, and it may be asked how could a tooth be moved inward. In the upper jaw a hole might be trephined into which the tooth and section of bone might

be moved or left to move, owing to subsequent absorption, and in the lower jaw the saw-cut segment might as well be moved in an inward as in an outward direction.

The pain attending an operation is always an important factor. It is, therefore, worth noting that in the majority of these operations, severe as they were, no anæsthetic was employed, which goes to prove that the operation, dreadful as it may sound, is not so terrible as it at first sight appears. In erupting teeth and simple cases the pain is very slight and of brief duration.

As regards the results of the operation, if my plea for the surgical method rested on the single case of the patient brought before you to-night, where five contiguous teeth have been moved a tangible distance, retaining all their functional integrity as they do after a period of three years, and as you can see for yourselves, it should go far to disarm your not unnatural prejudice against a seemingly wanton and radical method of treatment.

Equally important, equally convincing, is the experience of other operators, notably of Dr. Bryan, who recorded the fact in 1892 that even with the older method he had operated since 1888 in fifteen cases, all of which were successful except two. In June, 1895, he writes :—"I have many cases here of cuspids and incisors, all doing well, but in a few older cases, where great irregularity existed, or where the tooth was moved a great distance, I have had the pulps die under the operation. In all cases where the roots were not fully developed, as in cases of children of 7 or 8 years of age, the method works like a charm.

It is evident that he has equal confidence with myself, and he has not hesitated to employ the method on a member of his own family. I believe Mr. Paterson has adopted the method with success, and I am especially glad that Mr. Spokes

has brought it into force in his treatment of what we may call the waifs and strays. The Collective Investigation of the British Dental Association proves the recurrence in every generation of school children of a large percentage of children with irregular teeth. One needs to be a dentist to understand how impossible it is to treat even a fair proportion of such cases by the time-honoured—and justly so—ordinary methods of regulation with plates, especially in case of the very poor and State-supported children. In this method of rapid immediate treatment we have a means of correcting conditions which otherwise must go uncorrected, and converting many a human carnivore—and as such deficit in masticatory powers—into a properly functioning omnivore, with all that effective lateral movement of the jaws which is essential to thorough mastication, and therefore to digestion.

If, as I take it, the proper goal of the dentist is to maintain and restore when lost, the functional integrity of the denture as a physiological unit of the greatest importance, he must admit that the immediate method, while in no way supplanting older methods with their greater safety, does fill a niche not previously occupied, since it gives us a reliable method of treatment where mechanical means are out of the question, owing to the best age period having been passed without rectification of the irregularity, or still more, owing to the inability of the patient to command the means of obtaining what must remain much more costly treatment.

For, after all, what is the worst that can happen in all well-conducted cases, but the death of a tooth pulp? Surely a pulpless but well-treated tooth, even if it have lost much of its natural colour, arranged in symmetrical array with its fellows, duly articulating and not interfering with them, is better much better, than one in all its pristine beauty out of the arch, and interfering with efficient mastication. The function of

mastication alone has been emphasized so far, but in some cases improved appearance as well as improved speech have resulted, and are not without importance.

In conclusion, while thanking you for patient attention, I would especially record my thanks to those by whose co-operation I have been enabled to command that attention, and especially the grateful patient, who, not for the first time has come from a distance to show the results of what I am bound to confess, we regarded at the time as a somewhat bold experiment, in the hope that it may be of use to others through your instrumentality, should you approve of the end and the means thereto.

ORAL SURGERY.

By EDMUND W. ROUGHTON, B.S., M.D. (Lond.), F.R.C.S.
Eng.

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(Continued from page 728.)

PERIOSTITIS OF THE JAWS.

The periosteum of the jaws in addition to covering the surfaces of the bones, affords a lining to the sockets of the teeth known as the periodontum, pericentum, or alveolo-dental membrane. It is convenient to limit the term *periostitis* to inflammation of the periosteum covering the surface of the bones, and to apply the terms *periodontitis*, or *pericementitis* to inflammation of the alveolo-dental membrane.

PERIOSTITIS.

Varieties. Periostitis may be *acute* or *chronic*; *circumscribed* or *diffuse*; *osteoplastic* or *suppurative*; it may also be due to a number of different causes.

Causes. These may be divided into local and general.

The local causes are injury such as blows, wounds and fractures, and extension of inflammation from the adjacent bone, (as in alveolar abscess), or mucous membrane (as in ulcerative stomatitis).

The general causes include syphilis, struma, gout, rheumatism, certain exanthematous fevers, such as scarlatina, measles and variola, and the excessive use of certain drugs, especially mercury.

Pathology. The pathological changes are simply those of inflammation; the outer fibrous layer swells and becomes redder than natural, whilst the cells of the osteogenetic layer proliferate and loosen the attachment of the membrane to the bone. The inflammation may terminate in *resolution*, or may go on to the formation of an *abscess* between the periosteum and the bone. Suppuration most often occurs in acute periostitis, especially when of septic origin, but it may also follow chronic periostitis in persons whose health is undermined by syphilis or tuberculosis. Periosteal suppuration often leads to *necrosis*. Chronic periostitis in an otherwise healthy person, usually leads to the deposit of new bone in the shape of a *node*.

Symptoms. In the majority of cases of *acute periostitis*, the symptoms will have been preceded by those of periodontitis in connection with a decayed tooth which has started the mischief. When the inflammation has reached the surface periosteum, considerable swelling of the gum ensues accompanied by very severe pain. The swelling is at first hard to the touch, and extremely tender, but soon softens in its centre

from the formation of pus ; the face becomes swollen and red. The local condition is usually accompanied by general febrile symptoms, the temperature is raised, the tongue furred, the appetite lost, the bowels confined, etc. The subsequent symptoms will depend upon the course of the disease ; if resolution occur, the local and general symptoms gradually subside, but if on the other hand the inflammation go on to suppuration or necrosis, a further train of symptoms ensues, which will be presently described.

In *chronic periostitis* there are usually no febrile symptoms and the local signs are limited to the formation of an indolent swelling on the surface of the jaw, which usually causes more or less aching pain, worse at night. Chronic periostitis is most often syphilitic in origin, but may be due to any of the causes mentioned above. In diagnosing a case of periostitis of the jaws, it is necessary to discover the cause as well as the nature of the affection ; with this object the history of the case should be carefully gone into, and signs of disease in other parts of the body looked for.

Treatment. The first thing to do is to remove the cause of the disease when this is possible ; this having been done, means must be adopted to allay the inflammation and to prevent it leading to suppuration and necrosis.

In most acute cases the cause will be found in a carious tooth ; the surgeon must then determine whether the offending tooth is to be extracted, or whether it can be rendered innocuous by appropriate means. This is a point upon which the opinions of the dentist and of the general surgeon do not always coincide, the former sometimes endeavouring to save a tooth which had better be extracted, whilst the latter as often (perhaps more often) errs in the opposite directions therefore it is desirable that a consultation should be held when possible. The most efficient way of allaying the local

inflammation and preventing its evil effects is to make a free incision through the inflamed part right down to the bone. When the swelling is acute and of any considerable amount, this should always be done whether pus has formed or not, the relief of tension and the local blood-letting thus obtained have the most beneficial effects. The incision should be followed by the use of a warm antiseptic mouth wash. A saline aperient followed by a tonic is usually required. In chronic periostitis the cause is more often a constitutional one, such as syphilis, and therefore more benefit accrues from appropriate constitutional treatment than from local remedies, yet it is important in every case to see if there is any source of local irritation.

PERIODONTITIS.

Periodontitis may be *local* or *general*—i.e., it may affect one socket or many ; either variety may be *acute* or *chronic*.

Acute local periodontitis is usually due to the escape of septic matter (bacteria) from the pulp through the apical foramen, setting up acute inflammation in the tissues occupying the apical space. The inflammation usually goes on to suppuration (see Alveolar Abscess), but may become chronic or may undergo resolution ; it may remain localised to the dental periosteum, or may extend to the bone and to the surface periosteum producing conditions already described.

Symptoms.—The affected tooth is slightly raised in the mouth and feels uneasy, but at first the uneasiness is relieved by biting ; soon the surrounding gum becomes red, swollen, and tender and the uneasy sensation is replaced by actual pain, which is of a constant gnawing character and is no longer relieved by biting ; if suppuration occurs the swelling increases, and the pain becomes throbbing in character, and the abscess thus formed points (see Alveolar Abscess).

Treatment.—The offending tooth must be removed, or dealt with according to approved dental methods as occasion may require. A free incision should be made over the swelling, and the mouth repeatedly rinsed with a warm antiseptic wash. In slight cases where there appears to be no risk of suppuration, the gum may be painted over with a mixture of equal parts of liniment of iodine, tincture of aconite and chloroform. The bowels should be freely moved by a saline aperient and a tonic (preferably quinine) prescribed.

Chronic local periodontitis may follow the subsidence of an acute attack, or may be chronic from the first. It is usually caused by some morbid or abnormal condition of the tooth, but it is predisposed to by struma, syphilis, rheumatism, &c. The chief *symptoms* are looseness of the tooth, tenderness on percussion, and a dull, gnawing pain. The *treatment* consists in attending to the general health, and in dealing with the morbid condition of the offending tooth.

Acute general periodontitis is usually associated with periostitis of the surface of the jaw ; it may be due to injury (especially septic wounds), to the effects of mercury or phosphorus, to blood dyscrasiæ, such as syphilis, struma, and rheumatism, or it may follow upon scarlet fever, or other exanthemata. It is very apt to produce necrosis (which see).

Chronic general periodontitis is usually of the suppurative variety leading to exudation of pus around the necks of the teeth, a symptom known as *pyorrhœa alveolaris*. Many authorities regard pyorrhœa as a disease, but it is in reality only a symptom. There are two varieties of chronic general periodontitis, and they both cause pyorrhœa.

(a) *Calcareous periodontitis* is due to the irritation of calculous deposit on the teeth ; the calculus may be derived from the

saliva (salivary), or from serum exuding from an inflamed gum (*serumal*). Salivary calculus is found most abundantly in the neighbourhood of the openings of the salivary ducts—viz., on the lingual aspects of the lower incisors, and on the buccal surface of the upper molars, but may spread to other parts ; it acts as an irritant leading to inflammation and gradual destruction of the gum, the peridental membrane and even the alveolar wall ; in this way the teeth gradually loosen and fall out. Serumal calculus is found most frequently on the necks of the teeth, hidden under the margin of the gum (Fig. 12), its distribution not bearing any relation to the openings of the salivary ducts ; it is generally in the form of little nodules, or a hard crust of brownish colour firmly adhering to the tooth ; it is very irritating and produces chronic inflammation and destruction of the peridental membrane. As the peridental membrane is detached and destroyed, the alveolar wall is slowly absorbed, and the gum recedes, exposing the calculus to view, but the destruction of gum tissue is not so marked as in the case of salivary calculus. With both kinds of deposit the gum is apt to be spongy and to bleed readily, and pus exudes on pressure being made with the finger. The treatment of calcic periodontitis consists in extracting those teeth which are hopelessly loosened, and in removing the calculus from those which can be saved. (For the details necessary to carry out the treatment a work on Dental Surgery should be consulted.)

(b) *Phagedenic periodontitis* differs from the calcic variety more in its cause and mode of progress, than in its ultimate result ; whereas in the calcic variety the destruction seems to be due to the irritation of the deposit, in the phagedenic variety the destructive inflammation seems to depend chiefly on the action of micro-organisms. The mouth always con-

tains myriads of bacteria many varieties of which are capable of setting up destructive inflammation in any tissue of lowered vitality, but as far as is known, there is no specific micro-

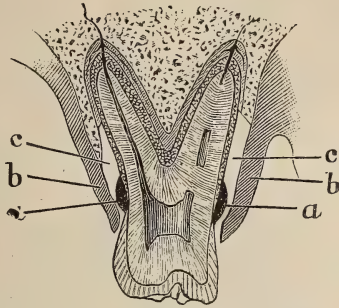


Fig. 12. Section of upper molar, showing destruction of Perident a membrane and alveolar wall in Phagedenic periodontitis, *a*. serumal calculus, *b*. gum separated from tooth, *c*. pus cavity formed by destruction of periodental membrane and alveolar wall. (From the *American System of Dentistry*.)

organism for phagedenic periodontitis. Some authors have assigned a large share in the etiology of this disease to gout, but, apparently without sufficient reason.

Although the same parts are destroyed in the calcic as in the phagedenic variety of this disease there is an important difference in the extent and mode of progress of the destruction, for whereas in the former disease the destruction of tissue is co-extensive with the deposit of calculus, in the latter the periodental membrane is the part primarily affected, and its destruction takes place in an irregular manner so that deep sinuous pockets are formed which may extend right up to the apex of the root (Fig 13). Many cases are complicated by calcic deposit but in them the pockets extend far beyond the line of deposit; in some cases there is no calculus present. The absorption of the alveolar margin follows very closely, and seems to be dependent upon the destruction of the peri-

dental membrane; where absorption is taking place the margin of the socket is often everted and thickened. Ultimately the tooth becomes completely loosened from its attachments and drops out, the alveolus disappears and the disease reaches its natural termination. The disease is undoubtedly infectious in that neighbouring teeth become affected, but whether it can be conveyed from one person to another is not yet definitely determined.

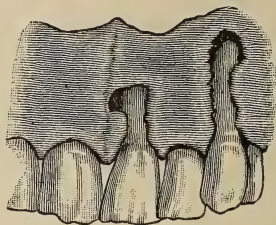


Fig. 13. PHAGEDENIC PERIODONITIS.

The soft tissues have been reflected, showing the extensive destruction of the periodontal membrane and alveolar wall. (From the *American System of Dentistry*.)

Treatment.—All trace of calculus should be very carefully removed. The pockets should be syringed out daily with a solution of perchloride of mercury in peroxide of hydrogen of the strength of 1 grain to the ounce; when the pockets are deep and sinuous they may be opened up by an incision through the gum. When the alveolar margin is much thickened or everted, it may with advantage be cut away with a chisel. Teeth which are hopelessly loosened should be removed.

(*To be continued*).

British Journal of Dental Science.

LONDON, SEPTEMBER 2, 1895.

SERUM THERAPEUTICS.

We have previously drawn attention to the new mode of treatment which seems to promise wonderful results in infectious diseases. And we described how an animal, such as the Horse, could be rendered "immune" by repeated injections of small quantities of poison. The serum of the blood of such an animal rendered immune, say to the diphtheria poison, when injected into the body of a patient suffering from that disease appears to exert a most beneficial influence. It is true that all observers do not speak in favour of this treatment, but there can be little question that the bulk of the evidence brought forward is of the most encouraging nature. It was only to be expected that the matter should receive serious consideration at the recent meeting of the British Medical Association, and Dr. KLEIN opened the discussion with an endeavour to explain the nature of "antitoxin." It is now held that phagocytosis (or the "eating-up" of bacteria by certain cells called leucocytes) does not play the important part in procuring immunity which was formerly supposed. Recent observations go to show that the condition of acquired immunity is intimately bound up with the presence in the blood and tissue juices of substances comporting themselves like chemical, that is, non-organised, bodies. For want of a better name these are termed "antibodies," and they have been experimentally proved to exist in the blood of an animal artificially immunised, and also in the blood of human beings who have acquired immunity by having previously passed through an attack of the same disease.

One of the most interesting questions is whether the

serum acts against the toxin (or poison) or against the living bacilli producing the poison, or against both these. Again, it is highly probable that it possesses two different actions, the first antitoxic, and the second an immunising one. It seems that the injection of a pure toxin produces a high antitoxic action of the serum, whilst the introduction of living bacilli results in an increased immunising power; it is therefore suggested that the two forms of injection should be combined in order to obtain a serum which will give the best action.

Dr. J. W. WASHBOURN, who followed in the discussion, spoke from the clinical aspect. He pointed out that the principle of serum therapeutics depends upon the fact that the blood serum of animals highly immunised by artificial means to any bacterial disease possesses the property of protecting other animals against the same disease. It makes no difference whether the serum is administered before, simultaneously, or after the infection provided that, in the latter case, the disease has not advanced too far before the protective injection is made. Up to the present the method has only been thoroughly applied in the cases of tetanus and diphtheria, although it would seem to hold good in all bacterial diseases. If so, an entirely new era in the treatment of many of our most fatal infections seems to be commencing. In tetanus there is no characteristic lesion at the point of infection, and the case is only to be diagnosed when the disease has far advanced; but in diphtheria there is a better chance, and the results of the serum treatment are more marked. Over 3000 cases have been recorded in which the mortality has been carefully compared with that of cases not treated with antitoxic serum, and all the statistics show a reduction; sometimes the decrease in mortality has sunk to half what it was before. Dr. WASHBOURN believes that serum therapeutics will be to Medicine what the antiseptic treatment has been to Surgery, and that we shall soon be in a position to cure many diseases which have hitherto resisted all other methods.

PECULIAR PEOPLE AND THE TOOTHACHE.—A man has been committed for trial, charged with “neglect” of four children who died from diphtheria. He belongs to the “Peculiar People” who have conscientious scruples which prevent them calling in medical aid. One of the elders called to give evidence to that effect, was asked the question which coroners put from time to time. What is done in the case of broken limbs? The elder admitted that he, himself, should send for a doctor, but he could not answer for “the sect” as the Peculiars never yet had a broken leg to deal with. From the newspaper report, however, we gather that he explained this strange statement by saying that a man is not one of the Peculiars when he breaks his leg. We cannot help speculating what happens when a tooth is the organ affected. An exposed pulp which clings to life is not an unknown phenomenon. Would the application of an arsenical dressing determine the right of a person to remain a Peculiar? There are some peculiar people, but *they* are ignorant, who prefer a fistulous opening on the cheek to proper dental treatment!

COVERING.—*The Lancet* recently added a note to a correspondent's letter, expressing the opinion that the General Medical Council is always ready to act in cases of covering and unqualified practice. Another correspondent now writes giving his experience. Two years ago he furnished the particulars of three cases in which an unqualified assistant, in charge of a branch, had signed the death certificate. He was then requested by the Council to procure statutory declarations, but as he would have had to pay for these himself, and court publicity, he allowed the matter to rest, and the evil still remains. *The Lancet* now has to point out that the General Medical Council possesses no machinery for collecting evidence itself, and does not exist for such purposes. It will be ready to act when such a case as that mentioned, is brought forward properly substantiated. “No tribunal can do more; for the Council is a disciplinary court, not a detective body.”

PHOSPHORUS AND JAW NECROSIS.—There still seems to be some trouble in France about this question, in connection with the manufacture of matches. Dr. Magitot is to have an opportunity of seeing a suspected case of necrosis, for the Marseilles Syndicate has voted £6 to send a lucifer match worker to Paris for the consultation. It appears that two of the Marseilles doctors have diagnosed a phosphorous jaw, whilst the Administration medical men refuse to treat the case as such, as they have not detected the symptoms of the disease.

SECUNDUM ARTEM.—*The Chemist and Druggist* reports the following interesting case. Joseph Bachmann, who practises the arts of hairdressing, dentistry, or, apparently, anything else that is likely to be lucrative, figured in one of the Paris police courts a few days ago on the charge of wounding by imprudence and illegal practice of dentistry. A woman named Trottier had asked Bachmann to extract a tooth, and he extracted a part of her jaw at the same time. "Yes, gentlemen," said the plaintiff to the Bench, "I am not telling an untruth; he has maimed me," saying which she presented a small box to the Chairman, who was able to distinguish a decayed tooth with a dark substance attached. The defendant explained that he had learnt dentistry with a hairdresser in Germany, "as the barbers of all countries draw teeth." The operation in question, he said, was done according to all the rules of the dental art, and he defied the cleverest dentist to have prevented the accident. In reply he was told that he worked at too many professions to know one properly, and that his client had been obliged to keep her bed for a month. The question of illegal practice was withheld for the present, and Dr. Brouardel was appointed as an expert to report on the way the operation had been performed, as well as the extent of the injury sustained by the patient.

A TOOTH IN THE NOSE.—At a meeting of the Medical Society of Christiania, Dr. Dave showed a tooth removed from the nose of a woman aged 53 years. The patient had complained of ear trouble, and during the ordinary examination the tooth was accidentally discovered. It was situated at the junction of the floor and external wall of the nasal cavity, and was easily removed from a small depression. It is said that the patient had all her teeth, although they were placed somewhat far apart, and therefore the abnormally placed tooth may be regarded as a supernumerary one. It resembled a milk canine, and the end of the imperfect root was covered with a fold of mucous membrane, with stratified epithelium. The speaker suggested that part of the mucous membrane of the mouth, with its tooth germ, had become impacted between the superior and premaxillary bones, and thus cut off from the cavity of the mouth. Another speaker criticised this foetal dislocation, and believed it to be due to an inversion—a development in the wrong direction—by which the tooth had grown upwards into the nose. The same speaker also pointed out that the stratified epithelium of the mucous membrane did not prove a connection with the cavity of the mouth, as it is known that cylindrical epithelium cells after irritative processes, are replaced by flat ones.

SPECIALISM.—In connection with a discussion upon charging high fees, a correspondent writes to *The Lancet* suggesting that some general as well as special practitioners are guilty of this “crime.” He thinks that to argue against specialism now is to argue against civilisation. The specialist with special practice must excel, and he takes one of the “simplest” of specialties—dentistry, with which to point his moral. “Few departments, if any, are easier to attain a knowledge of, yet what proportion of dental work falls to the lot of the general compared with the special practitioner?” We venture to think that at all events in respect of conservative dentistry, very little is done by the

general practitioner, and for a very good reason. As to high fees, well, competition brings its own reward, but the best work requires an expenditure of time which must be paid for, and as an indication that a high standard of excellence is being maintained, we should rejoice to hear of such cases.

UNHEALTHY HOUSES.—At the Health Congress at Hull, Dr. CAMERON, Medical Officer of Health for Leeds, advocated the systematic examination of all houses, old and new, street by street. His experience is that people would welcome it, instead of objecting, even where no complaint has been made. In a row of new houses (in one of which diphtheria appeared) built under modern by-laws, and carefully inspected when built, with every waste cut off from the sewer, and all the sanitary conveniences outside the dwelling, seven out of ten showed a communication between the air of the sewer and that of the house. This would go to show that even modern building by-laws carefully carried out by able inspectors, will not necessarily guarantee the healthiness of a house a few years later. “But what about houses constructed where the by-laws were not modern? In all our large towns there are many houses with wastes not severed from the sewers. In a recent investigation on the outskirts of a large town of some 100 contiguous houses, all more or less recently built, and of which nearly two-thirds had all their wastes cut off and the remaining third not, it was found that the smell of a chemical entered the house through the drains in 19 per cent. of the former, and in 60 per cent. of the latter.”

A THEORY OF RICKETS.—According to a communication by MIRCOLI, in the Turin Medical Gazette, experimental injection of pyogenic microbes into the developing bones of young rabbits produces osteomyelitis. In some cases the

osteomyelitis is unaccompanied with any sign of suppuration, there is hypertrophy of the ends of the bones, and of the cartilages analogous to that of rickets, and there is also marasmus. Pyogenic organisms have been found in the bones and central nervous system of rickety children, and the author believes that the disease is caused by the effect of such organisms. From the clinical aspect he points out that it develops independently of social conditions, that it frequently commences with eczema, boils or intestinal catarrh, and is accompanied by fever, pains in the bones and joints, and by hydrocephalus, marasmus and paresis. Sometimes it occurs epidemically.

STEEL SCREWS IN BONE.—It has been suggested that in cases where a portion of the mandible has been removed, a metal rod may be inserted into the ends of the bone, to keep them apart during cicatrization. The tendency for these to approximate is always a serious matter, and union of the misplaced ends results in considerable deformity. Ivory pegs, we know, have been inserted into bone, but metal would seem likely to set up more irritation. If we remember rightly, Mr. Stanley Boyd used a piece of knitting-needle to keep the rami of the jaw separate, and we are reminded of this by reading an account of a case under the care of Mr. Arbuthnot Lane. In this instance, however, it was desirable to secure adaptation of bony surfaces instead of preventing union. It illustrates very well the great advantage that a surgeon can obtain by the use of the steel screw. Mr. Lane says :—"As far as I know I could not have retained the fragments of the os calcis in the foot in a position of adduction without the aid of this very powerful mechanism, and one has the satisfaction of knowing that by its use one has converted a patient from a condition of absolute physical incapacity into one of perfect mechanical usefulness."

Abstracts of British & Foreign Journals.

DISEASES OF THE MAXILLARY SINUS.

By HARRISON ALLEN, M.D., Philadelphia.

These are of five kinds, as follows, in the order of their frequency : First, a secondary pus-formation dependent upon irritation at the root of a tooth. Second, a purulent inflammation seen in the rheumatic subjects and not to be separated from exhibitions of rheumatism seen elsewhere in the economy. Third, extension of empyema of the frontal sinus into the maxillary sinus. Fourth, polypoid degeneration of the mucous lining of the sinus. Fifth, presence of sero-mucus formed under catarrhal excitement.

First.—Pus in the maxillary sinus when arising from irritation at the root of a tooth is the condition which associates this disease with dental practice in a conspicuous manner. It is important to remember that a very slight amount of pus will sooner or later tend to find its way into the nose, so that a purulent discharge in the nostril should immediately leave the observer to examine the teeth, and if any of the molar or bicuspid series be found defective, they should receive prompt attention. Extraction of the offending teeth will cure the purulent discharge in a very short time, provided that no degenerate processes are set up in the mucous membrane or bone. It will sometimes happen that after teeth have been extracted and the pus collection entirely removed, relapses will occur. In such cases there is one of three conditions to study,—irritation of imperfect absorption of the bone about the bottom of the old socket, imperfect healing of the wound created by extraction, or the presence of inspissated masses, the products of inflammation, in the chamber itself.

Second.—The results of dental irritation may be present in persons of a rheumatic diathesis. But inflammation of any kind, whether excited by disease about the root of a tooth or not, may extend rapidly into the sinus. Such cases are more apt to occur in middle life than at any other period, and are probably more common in those with history of alcoholic

excess than in the temperate. Rheumatic inflammation may occur on both sides of the face.

Third.—Disease of the frontal sinus if neglected is apt to extend into the maxillary sinus. More than once after treatment of the frontal sinus the discharge into the nose continued, and a second operation was performed upon the maxillary sinus with result of demonstrating that empyema had existed in both the chambers. Several cases were seen in consultation where, after treatment of the frontal sinus empyema, the same condition was detected in the maxillary sinus.

Fourth.—The occurrence of a polypoid mass on the wall of the maxillary sinus may occur in the later stage of any disease affecting this chamber ; whether these growths are at any time the exciting causes of collection of pus is uncertain. This condition is perhaps the most inveterate of any to which the maxillary sinus is subject. Fortunately, it is rare.

Fifth.—In the last place we have occasionally present effusion occurring in the maxillary sinus. I have not seen this condition described, and it was unknown to me prior to my custom of using transillumination as an aid to diagnosis of disease in this portion of the body.

No case has come under my notice in which I could prove that inflammation of the maxillary sinus had extended from the nasal chamber. On anatomical grounds such an extension is readily explicable.

It is probable that the instances in which this effusion occurs are more numerous than we have supposed, owing to the fact that prominent symptoms are not created by the presence of the fluid.

Syphilitic disease, of course, may be located in the maxillary sinus as well as in any other part of the economy. All affections of the maxillary sinus appear to be much less frequent in the well-to-do than in the poor class of patients. Judging from my own experience, about eight per cent. of the crania obtained from dissecting rooms exhibit evidences of inflammation of these parts. Physicians in charge of large dispensaries report that one or two cases of antral disease are generally found at any time on the list of applicants ; yet dentists with a large practice inform us that they almost never see diseases of the maxillary sinus.

LATENT TUBERCULOSIS OF THE TONSILS.

By T. K. MONRO, M.A., M.D.

M. Dieulafoy recently made two very important communications on this subject to the Academy of Medicine in Paris. Besides the two classical forms of pharyngeal tuberculosis, the one acute and very painful, with granulations, and the other chronic and ulcerative, and scarcely affecting the glands, this observer describes a third form, taking the form of adenoid tumours with hypertrophy of the tonsils. To demonstrate it, he made 96 inoculations—61 times with pieces of tonsil, and 35 times with adenoid vegetations removed by different laryngologists or surgeons. Guinea-pigs inoculated with tonsil died of tuberculosis in 13 per cent of cases; those inoculated with adenoid tissue died in the same manner in 20 per cent of cases. This latent tuberculosis is often due to milk or other food from tuberculous animals. The tubercular bacillus, which, as Straus has shown, may be present in the nasal fossæ of healthy subjects, can find, in children predisposed to lymphatic-tissue hypertrophy, an excellent culture-medium in the tonsil. This tissue struggles, as it were, to become fibroid as the natural mode of cure. But too often the glands become affected, and the morbid process may extend further under the depressing influences of intercurrent diseases, such as small-pox, influenza, and especially syphilis. The organism gradually reaches the nervous system and the lungs by way of the right heart. If tuberculosis attains this stage, it may of course become still more widely disseminated.

M. Chauveau, commenting on M. Dieulafoy's paper recalled his experiments on the action of tuberculous foods. Infection by the mouth is common, as the swelling of the submaxillary glands testifies. In cattle which have no tonsils, the portal of entrance is the adenoid tissue at the base of the tongue. In the pig, infection by the tonsils, even without obvious lesion of the epithelium, is frequent. In the calf, buccal infection produces a rapid general tuberculosis such as is not produced even by subcutaneous inoculation.

Dieulafoy returned to this subject a week later, to deal more particularly with its therapeutics. The most rigorous precautions must be taken to safeguard children who are hereditarily predisposed to tuberculosis, and who belong to

families some of whose members are already suffering. Children of this kind ought to be removed from such hot-beds of infection, and if this is impossible, the sick friends must be instructed to spit only into special vessels containing some antiseptic solution, so as to avoid dessication of the sputa and scattering of the bacilli in dust. Bacilli which enter the nasal fossæ of resistant persons remain innocuous, but in predisposed subjects these organisms may rapidly bring about fatal results. Contagion may occur, not only through the milk of cows with mammary tuberculosis, but also through eating undercooked meats, even though salted and smoked, or cheese made from infected milk, though these modes are not so common. Food given to any child that is in danger of tuberculosis, either by contagion or by heredity, ought to be thoroughly cooked. Milk should be sterilized. If, in spite of these precautions, infection of the tonsil should occur, good feeding becomes all the more indispensable, and in particular with fatty substances. Codliver oil should be given by the glass and not by the spoonful. Tunny, sardines in oil, pâté de foie gras, butter, and caviare may be included in the dietary. The child should live at the seashore, and the stay there ought to be very prolonged. Of the children suffering from cervical adenopathy who live for fifteen months at Berck, 76 per cent come back cured. With a residence of only three months, the figures fall to 41 per cent. From the surgical point of view, ignipuncture or electropuncture is preferable to ablation, as the latter might open a gate of entrance for the bacillus.

Glasgow Medical Journal.

According to the *Australasian Journal*, a Society called "The Odontological Society of Victoria Limited," was registered under the Companies' Act on the 30th May. The Articles of Association are signed by E. L. Oldfield, W. A. Smith, J. Doubleday, W. E. Davis, and E. E. Howarth, who form the Company. The registered office is 34, Nicholson Street Fitzroy.

FILLING MATERIALS.

By G. V. BLACK, M.D., D.D.S., Sc. D., Jacksonville, Ill.

The following is an abstract of one of the series of papers by Dr. Black to which we recently drew attention.

When it is required that a bridge be constructed for a railway over a stream of any considerable magnitude, the civil engineer to whom the formation of plans is referred will first ascertain the condition of the ground in which his foundations must be placed, and the weight of the trains which it is expected will cross the structure. Then he will proceed to develop his plans, studying each part of the stone and iron work as to its strength in the position placed. If he be wise he will add largely to the actual strength required in order that it may be sufficient to bear any reasonable degree of unforeseen stress, or overcome a failure of some beam or girder which may fall below the calculated strength. This overplus of strength is considered necessary in all such engineering operations.

In the use of filling materials with which carious cavities in the human teeth are repaired, it would seem that similar inquiries should be made as to the strength of the material used as well as to its chemical qualities. This strength should have some relation to the strength of the teeth, and to the force with which they are brought in occlusion, both in their ordinary uses and in their extraordinary uses. Indeed, if fillings are expected to endure, the material should have sufficient strength to bear without injury, the greatest stress the human jaws are able to bring upon it, and continue to do this year after year continuously.

In my paper in the May issue of the *Cosmos* the strength of the teeth which serve as the foundations of fillings was examined, and in the June issue the extraordinary and the ordinary stresses to which they will be subjected in mastication was determined. In these examinations it was found that the teeth when normal are, all of them, abundantly strong, and have strength to spare in such degree that when considerably weakened by caries they have still sufficient strength to support fillings against both the ordinary and the extra-ordinary stresses brought upon them in mastication, provided these are properly anchored into their substance. However, the filling material itself, if it is to endure, must

be sufficiently strong to bear this stress continuously as it comes upon it thrust after thrust, year after year.

The stress in the ordinary use of the teeth has been shown to be from sixty to eighty pounds upon the area of two molars of medium size. This if evenly distributed would give from seven and a half to ten pounds on a filling occupying one-fourth the area of one of these teeth. This would be a filling of ordinary size. But it frequently happens that the filling must bear all of this stress, and occasionally such fillings must bear all of the stress that the person is capable of exerting. Therefore, while the filling itself may not have to endure a stress of more than seven and a half to ten pounds in chewing a piece of beefsteak, it is continually liable to have to bear the whole stress when some hard substance is caught upon it, or even the whole stress the person can exert. This may be anywhere from one to two hundred pounds, or even a greater stress in some cases. Gold and amalgam are the only filling-materials in general use that are supposed to be able to endure this stress continuously. Fillings of other materials are therefore regarded as temporary structures when placed in positions of exposure to the stress of mastication.

The silver tin amalgams at present in use are alloys composed of silver and tin, and which are cut into filings, or shavings, and combined by amalgamating, or mixing with mercury. These alloys are composed of varying proportions of silver and tin, this variation ranging from sixty parts of silver to forty parts of tin, to forty parts of silver to sixty parts of tin. Occasionally alloys are made with a larger proportion of silver. The greater number of the alloys at present in use have additions of small quantities of other metals, such as gold, platinum, iridium, copper, zinc, bismuth, etc. These alloys are mixed with varying proportions of mercury, which may be said to range in ordinary practice from thirty per cent. of mercury to seventy per cent. of alloy to equal parts of each by weight, or, exceptionally, a larger proportion of mercury may be used. The mercury is mixed with the filings or shavings by rubbing them together in a wedgwood mortar, or in the hand until a more or less smooth paste is formed, or if the quantity of mercury is too small for this, a dark semi-coherent powder. When considerable mercury is used in mixing, it is the common practice to remove the excess by wringing it out through muslin or chamois skin. This mass when packed together acquires a metallic hardness within a few hours, and its full degree of hardness, usually,

in twenty-four to forty-eight hours. It is then a hard, brittle mass that may be dressed with a file and polished as other metallic bodies. This material has already a somewhat extensive literature. Indeed, the question of its properties and its fitness as a filling material, has given rise to much discussion and a large amount of experimental research. I have not space in this paper to review this literature, however desirable such a review may be. But it has in nowise been ignored, but has been the foundation from which the present work has proceeded, and the absence of a review is purely a matter of lack of space.

It has been the intention to conduct a series of experiments upon the physical properties of amalgams upon the same general lines of research as those that has been found most satisfactory and reliable in the investigation of the resistance and elasticity of the metals used for engineering purposes, as railway bridges, buildings, etc., in which endurance and weight become important factors. These plans of experimental work have been well tried in the past, and have met the approval of the most learned engineers. For this purpose it has been necessary to devise and build apparatus adapted to the small masses of material used in making fillings. The endeavour has been to so arrange the detail of this work that others could follow it with the least difficulty for the verification of the results or correction of errors into which I may fall.

A silver-tin amalgam, when fully hardened, has the appearance of a hard, brittle, metallic body. This brittleness is very pronounced. When struck with a hammer, it breaks into thousands of fragments. If more stress is placed upon it than it is able to endure by turning up the screw of the dynamometer, it goes to pieces with a crash resembling that of glass. These facts have given rise to the notion that this characteristic brittleness was the essential physical property of amalgams, or in other words, to the notion that an amalgam, when fully hard, would support stress to the extent of its endurance and then crush, but that it was not otherwise subject to change of form under stress. This inference was justified by the general range of the physical properties of the metals. Cast iron is brittle, hardened steel is brittle, wrought iron is ductile, soft or untempered steel is ductile. Neither of these is both brittle and ductile at the same time. These two properties of the metals have generally been con-

sidered as opposites, the one being absent in proportion to the presence of the other. In this particular the silver-tin amalgams seem to be an anomaly among the metallic compounds for *they are at the same time both very brittle and very ductile*. If struck with a hammer they fly to pieces; but if subjected to a comparatively light stress, either continuous or intermitting, they may be drawn out into thin laminæ or moulded into any form without breakage. It seems that this heretofore unsuspected dual property of the silver-tin amalgams has given rise to much misconception as to the causes of their behaviour under the conditions to which this material has been subjected as fillings in teeth, and in experimental study.

In the study of these properties of the silver-tin amalgams, it is necessary to use instruments with which such stress as will crush them can be accurately measured, and also with which a less stress can be continuously exerted and the movement or yielding of the amalgam be measured. For this purpose I have used the dynamometer with micrometer attachment, the same instrument with which the strength and elasticity of the dentine was studied. With this instrument a block of amalgam of measured size may be subjected to any degree of stress and the effects noted. The stress may be turned on until the amalgam crushes, or a lighter stress may be placed upon it and maintained for any given period, and the yielding of the amalgam measured with the micrometer.

In order to render this form of study effective, it has been necessary to devise means of forming the amalgam into definite measurable forms and sizes. The forms chosen were cubes or square blocks and the sizes used have been 85 x 85 x 85 thousandths of an inch, 10 x 10 x 10 thousandths of an inch, and 130 x 130 x 130 thousandths of an inch. (All measurements will be given in thousandths of an inch.) For all general work the small sizes have been used, for the reason that often the larger sizes could not be crushed with a stress of 350 pounds, the full capacity of my instrument. For various experiments where the modes of manipulation were to be particularly tested, the large blocks have been used, because they gave more facility in manipulation.

When one of the smaller blocks is placed in the dynamometer and the stress turned on rapidly by means of the screw, it is found to crush, usually, when the stress reaches two to three hundred pounds, varying with the alloy and the amount

of mercury used in making the mass. It simply goes to pieces with a crash, the particles of amalgam flying in every direction. But if the stress is turned on until twenty-five, fifty, or one hundred pounds is reached, and maintained at one of these figures, quite another phenomenon will be discovered. The index needle of the micrometer will show that *the amalgam block is gradually yielding to the stress*. Now the time may be taken and the rapidity of this yielding measured, as the amount of yielding in one hour, in two hours, in six hours, in one day, or in two or more days. In this way we may test the stability or instability of the various alloys, and fix the rate at which they will yield to a given stress.

For the want of a better term, I call this yielding of amalgam *the flow of amalgam under stress*, or simply the *flow*. I wish to say, however, that it is something quite different from that which is described as "*the flow of solids*" in works on engineering. Burr describes the flow of solids as the movement that takes place among the particles of a malleable metal, upon or among themselves, when the mass is struck or pressed upon with such force as to change its form, and illustrates this by a diagram of the change of form and the movements (flow) of the particles of metal in an iron nut when a hole is punched through it. This flow is the same in one sense as in amalgam. But in iron, steel, gold, silver, and all of the metals, except tin and a few others of the soft metals, a given stress will cause a certain flow, which occurs immediately and ceases within one or two minutes after the stress is applied, although the stress be maintained. An increase of the stress produces an increased flow, which again ceases until there is an increase of the stress. The flow of amalgam is different in this; when the flow has begun, it continues as long as the stress is maintained. No increase of the stress is required to maintain the flow, even after the area of the amalgam has been greatly increased by the flattening of the mass between plain surfaces. If a stress of fifty pounds be put upon a block of amalgam one-tenth of an inch square, and maintained for one hour, flow will occur at a certain rate; if the stress be reduced to twenty-five pounds, the flow will continue, but at a reduced rate. There is a manifest disposition of the material to creep out from under a load. It will go slowly with a slight stress, somewhat quicker with a heavier stress, but it cannot be made to go

very quickly with a very heavy stress; it will break into fragments. A silver-tin amalgam is not malleable.

In all cases I represent this flow in percentages. For instance, if we place a block of amalgam $85 \times 85 \times 85$ thousandths of an inch under a stress of fifty pounds, it will be reduced almost immediately to, say eighty-two thousandths, enough so that any unevenness of the surface of the amalgam will be reduced and all parts become perfectly fitted to the surface of the steel. This measurement of eighty-two thousandths of an inch is then taken as the starting-point, and the time noted. At the end of one hour the micrometer is again read. If at that time the thickness of the block is reduced to seventy-four thousandths of an inch, a calculation will show a reduction of thickness of ten per cent., accompanied with a corresponding lateral expansion. The flow is ten per cent. This is a property that is so unusual among the metals and their alloys, that it may be difficult to fully comprehend it. Its importance is so great that I will describe it somewhat in detail, though as briefly as possible.

Tin and silver were subjected to examination. Tin is one of the soft, malleable metals. Blocks of chemically pure tin were formed by filing down a cast bar a little below the size of the small cavities in the apparatus and driven into the cavity with a small hammer until it was perfectly filled, and then dressed level with the surface. This was placed under a stress of fifteen pounds and the flow noted, taking the time after two minutes.

In 10 minutes the flow was 3.71 per cent.

„ 20	„	„	„	„	4.92	„
„ 1 hour	„	„	„	„	6.57	„
„ 6 hours	„	„	„	„	10.37	„
„ 12	„	„	„	„	22.22	„
„ 24	„	„	„	„	33.33	„

From an ingot of silver (999 silver and 1 of gold, U. S. assay) a cube was cut which measured $140 \times 132 \times 132$ thousandths of an inch. This was placed in the dynamometer on dimension 140, and a steel point 80 by 80 applied on its centre, and two hundred pounds turned on. It sank four per cent. at once. In ten minutes the movement of the needle indicated about five-thousandths of one per cent. more. After seven hours there was no further movement. After twenty-four hours more there was no further flow.

This result would indicate that in amalgams the disposition

to flow was imparted by the tin, but an examination of blocks cut from an alloy of equal parts of silver and tin proved it to be as resistant as pure silver. The logical conclusion is, therefore, that the flow results from the combination of the three metals, the tin, silver, and mercury. In this property of flowing the silver-tin amalgams are remarkably sensitive, so much so that seemingly trivial differences in mixing and working the mass produce wide differences in the percentages of flow. In the beginning of the work on this subject I found it impracticable to make a number of blocks, even from the same mix of amalgam, that would flow alike. I will give an example from among my first experiments.

An alloy of the following formula : Silver, 47.06 ; tin, 51.76 , copper, .94 ; zinc, .24, was mixed with mercury by grinding in a wedgwood mortar, as is ordinarily done in filling teeth. The mass was divided into two parts. One of these was wrung out through muslin. Of this four blocks were made with mallet force, removing as much of the mercury as possible while packing. Of this same portion of the mass four more blocks were made by hand-pressure, being careful to remove no mercury while packing. A third set of four blocks was from the portion of the mass not wrung out. Two days afterward all of the blocks were tested with a stress of fifty pounds. Of the first set, the first block gave a flow of 17.07 per cent. in one hour. The second 36.58 per cent. The third 23.57 per cent. The fourth, crushed at 255 pounds.

Of the second set, the first gave a flow of 23.63 per cent. The second 72.12 per cent. The third 22.41 per cent. The fourth crushed at 240 pounds.

Of the third set, the first gave a flow of 89 per cent. within ten minutes, without any break or crumbling ; it simply spread out in a thin sheet. The second block crushed at 40 pounds. The third block gave a flow of 69.13 per cent. in one hour. The fourth was found imperfect, and no test was made.

This alloy was mixed and used as different dentists mix and use amalgams in filling teeth, and certainly with as much care as is generally bestowed upon it. Yet the results show a variation that must astonish the reader as these results astonished me. The third series of blocks were of course mixed with entirely too much mercury, but the others were fairly dry, and were as carefully placed in the cavities as is customary in filling teeth, using the method of mallet force in the one case, and the method of hand-pressure with serrated

points in the other. I thought I had packed them with a fair degree of care. Yet there was no regularity in the results, as is shown by the flow differing fifty per cent. in the different blocks made from the same mix of alloy, and, as supposed, treated in the same way. I made a large number of experiments in this way, without obtaining any regularity of results. The idea that I was unable, after thirty years of experience, to make two fillings from the same mix of material that would test any nearer alike than those just given, was humiliating. Is it any wonder that results in the use of amalgam are irregular, and, while often good, are very often disappointing.

But, believing that there must be reasons for these differences in flow, it was determined that a series of experiments should be conducted so carefully as to develop them. In this series the formula of each alloy was known, the alloy and the mercury were weighed, the loss in mixing was recorded, the loss of mercury in wring out was determined, and the percentage of mercury remaining in the mass when ready for use was accurately determined, and all made a matter of record. Then every movement in making the fillings was noted, even to the number of thrusts of the instrument and the amount of force used, the plan of the work, whether or not mercury was removed in packing the filling; every detail was recorded in my book of notes. This manner of working soon gave results that developed the conditions which tend to increase or diminish the flow. The notes of this work are much too voluminous to be given in detail, but the principal facts can be condensed into a few pages. As a result of three months of close experimental study, the following results, obtained from the same formula and the same package of alloy as that given above, may be interesting.

R—Mercury,	1.060	milligrammes ;
Alloy,	1.060	„
Mass mixed in hand,	2.052	„
Loss in mixing,	0.068	„
Mass wrung out,	1.675	„
Mercury removed,	0.377	„
Final mass ; Mercury,	38.47	per cent. ; Alloy,
	61.26	per cent.

Fillings made with a broad, serrated point, removing no mercury :

Made March 25, 1895. Tests, March 27, 1895.

BLOCK.	TIME.	STRESS.	PERCENTAGE OF FLOW.
1.	Made immediately after mixing.	60 lbs. for 1 hour.	25.60
2.	" 10 minutes " "	crushed at 235 lbs.	
3.	" 20 " " "	60 lbs. for 1 hour.	24.69
4.	" 30 " " "	crushed at 235 lbs.	
5.	" 40 " " "	60 lbs. for 1 hour.	25.00

Made at the same time. Tests, March 29, 1895.

6.	Made 30 minutes after mixing.	60 lbs. for 1 hour.	24.94
7.	" 40 " " "	60 lbs. for 1 hour.	25.00

This test is from one of a series for determining the influence on the results produced by the time elapsing between the time the mix is made and the time at which the mass is packed. The results show that so long as the mass can be successfully packed, there will be practically no difference in its strength. My first experiments gave the preference to the last blocks made, even up to one hour ; but, as a more perfect regularity in packing was attained, this disappeared.

Dental Cosmos.

(To be continued.)

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Annual Meeting, June 10, 1895. Mr. Frederick Canton, M.R.C.S., L.R.C.P., L.S.A., L.D.S., President, in the Chair.

The Minutes of the last meeting were read and confirmed.

The ballot for the election of officers was opened, and Mr. George Hern and Mr. G. O. Richards were appointed as scrutineers.

The President stated that the necessary obligation forms had been signed by the following : Frank C. Porter, L.R.C.P. Lond., M.R.C.S., Eng., L.D.S. Eng., 12, Oxford Street, Nottingham ; G. Arthur Peake, Alma House, Cheltenham. Francis R. Flintan, Tower Lodge, Weybridge.

The following gentlemen were elected non-resident members of the Society ; William Jarvie, M.D.S., 105, Clinton Street, Brooklyn, New York ; John William Tomlinson, L.D.S. Eng., 8, Warrior Square St. Leonards-on-Sea.

The TREASURER (Mr. S. J. Hutchinson), in reading his

annual report, said: "I shall not detain you very long, because the finances of the Society are in a flourishing condition. The total receipts have been £541 2s. 6d., and the total expenditure £444 6s. 10d., leaving a balance of receipts over expenditure of £96 15s. 8d. Our invested capital in $2\frac{3}{4}$ per cent. Consols on October 31, 1894, was £3,767. I am glad to be able to tell you that with the dividends which have accrued, and some further small investments, the total of our invested capital to-day is £4,026. Another point I should like to emphasize is this, that out of a total of 377 members there are only 63 who have not paid their subscriptions for the current year in advance. I think that is a very gratifying circumstance. Out of those 377 members there are 87 who paid through the Bank, and I should like to take this opportunity of again thanking those gentlemen who do this, as it materially lessens the clerical work and ensures also greater accuracy in the amounts being properly paid into the Society's account. Those gentlemen who were present at the Annual Meeting, when it was decided to alter the bye-laws so that the Annual Meeting should be moved from January to June, will remember that there was some little discussion as to how the financial year should be regulated, and I think it is desirable to take this opportunity of reading a letter from the chartered accountants who audit the Society's accounts, giving an answer to the question which I asked them, with regard to the financial year. It seems anomalous probably to many of you that the financial year should terminate on October 31, and the Annual Meeting should be held on the first Monday in the following June. You will see, however, that our bye-laws were so altered that any gentleman nominated for membership at the January meeting would only pay the entrance fee and subscription for the current year, therefore that is exactly the same thing as it used to be, when a member was nominated at the Annual Meeting, but did not have to pay any subscription for the current year. I will read this letter from the Accountants in order that it may be placed on record, in the *Transactions*:—"Dear Sir,—In reply to the question of your letter, in our opinion it would cause great confusion, if the date of the accounts to which they are now made up, was altered, unless at the same time the date of the subscription was changed, and we think this can hardly be done without a large amount of explanation, which would require considerable correspondence, and even then we believe many of the members would be dissatisfied at

the alteration and at the result." I think we may take it therefore on the authority of these gentlemen that it is desirable to continue the present date of the financial year, terminating on October 31, in the year previous to the Annual Meeting. Of course it only makes a difference of a few months at the most. The Annual Meeting was formerly held in January; now it is held in June, and the financial year terminates in the October of the previous year. I think what I have said ought to be placed on the books of the Society for the benefit of future Treasurers.

The LIBRARIAN (Mr. W. A. Maggs) reported the following donations to the library: Mr. Harry Rose's works "On Vulcanite" and "Continuous Gum Work" by the author; Mr. Hopewell Smith's "Dental Microscopy," by the author; *Transactions of the American Dental Association*; "The North American Fauna," Washington, U.S.; *Transactions of the World's Columbian Dental Congress*, Chicago, U.S., 2 Vols; *Transactions of the New York Odontological Society*.

The LIBRARIAN presented the annual report of the library. He stated that the books added during the year had been announced from month to month, so that it was unnecessary to reiterate their names. The number of books borrowed from the library from January 1, 1894, to the present date was ninety-two. The list of exchanges had been increased, and it now included the following periodicals and journals:—*British Dental Association Journal*, *British Journal of Dental Science*, *British Medical Journal*, *Dental Hospital of London Students' Society*, *Dental Record*, *German Odontological Society*, *Guy's Hospital Dental Society*, *Guy's Hospital Reports*, *International Dental Journal*, *Lancet*, *Medical Society of London*, *National Dental Hospital Students' Society*, *Royal Dublin Society*, *Royal Institution of Great Britain*, *Royal Medical and Chirurgical Society*, *Royal Society of London*, *Smithsonian Institute*.

The *Transactions* were presented to the libraries of the Royal College of Physicians and Surgeons, and to the University of Berlin.

Other periodicals regularly subscribed for by the Society were:—*Dental Cosmos*, *Journal of Anatomy and Physiology*, *Journal of Pathology and Bacteriology*.

The following are sent gratuitously and are received with thanks:—*Chicago Dental Review*, *Dominion Dental Journal*, *Journal of the Pharmaceutical Society*.

As was well known to members the library was open on Mondays, Wednesdays, and Fridays, from 6.40 p.m. to 8.45 p.m. This arrangement has been in force since the last Annual Meeting in January, 1894, and the sub-librarian was in attendance upon these evenings. It was to be regretted that the library was not more used by members ; and unless it was more frequented as a reading room, the Council might not feel justified in retaining the services of the assistant. Some surplus volumes and numbers of the *Transactions* had been disposed of during this year, and there were still some copies that might be obtained. These sales had proved acceptable to some of the members, as they had been enabled to complete their series, and it had also permitted some relief in the matter of space in the library, an item of great consideration. It was desirable to call attention to the fact that there was a Suggestion Book on the library table in which the name of any book required might be entered, and the Council was always glad to consider favourably such suggestions.

CASUAL COMMUNICATIONS.

Mr. GARTLEY presented an ancient form of key used for tooth extraction.

Mr. MATHESON said Mr. Thomas Jackson, janr., of Burnley, had given him permission to show a very interesting case of odontome occurring in the right pre-maxillary region, which, according to Broca's classification, would be called an "odontome odontoplastique," and by Mr. Bland Sutton a "composite odontome." Some might doubtless prefer to call it a supernumerary tooth. It occurred in the incisor region in the mouth of a man aged from 19 to 20, who found no inconvenience or pain arising from it, but simply wished it to be removed as a matter which touched his vanity. It was proposed that it should be removed and two incisors put in its place, and on its removal it was found that the right central incisor was presenting in a perfectly normal position at the bottom of the socket of the abnormal growth. Mr. Jackson thereupon recommended his patient to wait and see whether the central tooth would come down into its proper position as it seemed likely to do. The case came into Mr. Jackson's hands early in March, but he had not been able to see its progress since. He noticed that just at the end of the root there was a considerable amount of absorption going on exactly in the position the cutting edge of the incisor found at the bottom of the socket would take.

Mr. THOMSON presented a specimen of bridge-work, the plate or bridge being fixed to gold crowns. The patient had been coming to him for the last two or three years complaining of pain. From the first he had advised the removal of the whole thing, but she went on until her health quite broke down, and then her medical adviser urged its removal. It had been in the mouth about four years. He also showed a specimen of a tooth which he extracted last year. It appeared that in the year 1869 his patient was struck on the face by the jib-boom of a yacht. In the following year, thinking that he had recovered from the effects of the blow, he came to London, where he was married. During his honeymoon he had a swollen face, and on application to a dentist for relief the left upper lateral was removed. The swelling subsided, and he thought it was all over. A few months afterwards the same thing occurred. The abscess was opened and afterwards the second bicuspid removed. About six months ago it became necessary to see a dentist again. He had been under medical treatment for some time, being troubled with external swelling of the cheek. He, Mr. Thomson, advised the removal of the second molar, and on that being done it was found that one of the roots was fractured. This was removed and it appeared that that fractured part of the root had been kept in position for about twenty-five years.

Mr. BRUNTON showed a cervical clamp, devised by Mr. Woodward, of America, which he characterized as presenting several interesting features.

Mr. SIDNEY SPOKES said : Since I gave notice to our Hon. Sec. of a Casual Communication on "Some Cases of Immediate Regulation" I find that another member is to read a paper this evening on the same subject, and this makes it easy for me to avoid alluding to historical and other details which, no doubt, Mr. Cunningham will deal with.

My communication comprises cases in which certain permanent teeth in the upper jaw had erupted within the arch, being bitten over by the lower teeth, and in which the corresponding temporary teeth were persisting. The usual method of treatment where permanent teeth are prevented taking their proper place by their retained temporary predecessors is, of course, to extract the latter ; but where the former have already become shut within the bite by the lower teeth some further interference is necessary. The ordinary method adopted in such cases in this country is, I believe, to insert a plate, which raises the bite and allows

the permanent teeth to be pushed out ; and although one has been successful in bringing such teeth forward without resorting to raising the bite, it may be supposed that cases occur in which the upper teeth have been pushed or led to the cutting edges of the lower teeth they refuse to cross.

The slides now to be shown illustrate a simple and, I believe, a justifiable way of treating the cases first mentioned. The temporary teeth were extracted and their permanent successors were then grasped with forceps and forcibly advanced over the edges of the lower teeth. Where there are neighbouring teeth a silver wire interlaced is sufficient to hold the advanced tooth in its new position. The accidents which may happen are : (1) the loss of the permanent tooth through injury to its pulp or by unintentional extraction, and (2) chipping of the enamel ; but both of these can, I think, be avoided. In the ten cases I bring before you, four centrals and six laterals are all comfortably in good position, and responded last Saturday to the application of heat. Of the three cases of canines only one can be claimed a success, although one other is now in good position. The forceps used are the ones usually employed for upper temporary molars, and may be conveniently guarded with india-rubber tubing on the blades.

Mr. George Cunningham then read a paper on "The Immediate Treatment of Irregular Teeth," which is published on p. 769.

VALEDICTORY ADDRESS.

At the close of the paper, owing to the lateness of the hour, the PRESIDENT suggested that as the communication was a very interesting and important one, and the Society could hardly discuss it adequately on that evening, it should be postponed until a subsequent meeting. After some conversation, in which one or two of the members expressed a wish that the discussion should then proceed, the question was put to the vote, and it was decided by a large majority to postpone the further consideration of the subject until the November or a subsequent meeting, at the discretion of the Executive.

The PRESIDENT said he had to announce that the election of those gentlemen proposed as officers of the Society was reported by the scrutineers to be unanimous. He would only detain them a few minutes with what might be called his valedictory address.

GENTLEMEN,—My term of office having come to an end, it only remains for me to address a few valedictory words to you. Owing to the alteration in the date of our annual meeting it has been my privilege to preside over this Society for a longer period than usual—viz, one year and a-half, instead of one year. During this period we have held twelve meetings, and have had some very interesting papers and casual communications brought before us. Nine papers have been read before the Society, and two subjects were taken for discussion, and one evening was chiefly given up to a microscopic display and conversation.

The members of the Society dined together for the first time, and considering the inclemency of the weather at the time, the gathering, I think, was fairly good, and from the expressions and opinions given, I believe the evening was appreciated by those present. Should it be thought well to continue this dinner as an annual affair, or to try it again experimentally another year, I think it would be better to try and make it later in the year. This year we should have done so, but were unable to secure the room for a later period.

Owing to the exertions of our secretaries we were able at the beginning of the session to issue a complete programme for the coming meetings, a thing, I believe, never accomplished before.

Our meetings have been well attended, and I am sure it will be gratifying to us all to know that 55 new members have joined the Society since the last annual meeting; 5 members we have lost by death, 5 have resigned, and 5 have had their names removed, making a total loss of 15, and leaving the Society with a net gain of 40, and bringing the number now to ordinary members; in addition, we have 32 honorary and corresponding members, and I would like to call the attention of the Society to this number, as I think it is very much in excess of what it ought to be for so small a Society. Much larger Societies limit the number to 10 or 12, and I think we shall do well to reduce our number in this respect.

In conclusion, I thank you all for the support accorded me during my period of office, and especially my secretaries and colleagues, and to offer my sincere congratulations to our new President, Mr. David Hepburn, under whose guidance, I doubt not, the Society will be greatly benefited.

Mr. ALFRED COLEMAN said he was sure that the proposition he had to make would be heartily responded to, not

only by those present but by every member of the Society. It was that their best thanks be given to their retiring President for the very excellent manner in which he had presided over the Society during the period of one and a-half years. It was his (Mr. Coleman's) great privilege to have had their President as one of his pupils. He was happy to tell them, as they would naturally expect, that Mr. Canton was a very attentive and diligent student and very successful in the work which he carried out. It afterwards became his still greater privilege to be associated with Mr. Canton as a colleague, and as in his case, so he could say of all his colleagues, that they worked together most harmoniously, in the most friendly manner, and he might add without presumption, to the good of the Institution with which they were associated. There were many members who had had greater opportunities of knowing the work carried out by Mr. Canton during the past period of his presidency, but the *Transactions* so admirably represented the work carried out at the Society, that reading them, as he did very attentively, he could form some judgment at least of the excellent manner in which the duties of the President had been discharged, and for which he now asked the Society to accord a hearty vote of thanks.

Mr. MATHESON said it was a very great privilege to be able to second the proposition made by his old teacher of twenty years ago, and for whom he had great regard. The Presidency of the Society was looked upon, and rightly so, as one of the greatest honours which the dental profession could bestow upon one of its members, but they must not forget that whilst it was an honour to be President of the Odontological Society it also involved labours and duties both strenuous and hard. It was for fulfilling those difficult and strenuous duties so faithfully, so worthily, and with such grace and urbanity that he now had pleasure in seconding this vote of thanks to their President.

The vote of thanks was carried by acclamation.

The PRESIDENT said he could assure Mr. Coleman and Mr. Matheson that he thoroughly appreciated the honour which was done him by electing him to the office which he had filled. It had been most gratifying to him to see Mr. Coleman present amongst them and to hear him propose this vote of thanks, for which he (the President) thanked them all most heartily.

Mr. BRUNTON proposed that a vote of thanks be given to

the officers of the Society, including the Treasurer, the Secretaries, the Librarian, and the Curator. He could not say that they had all been pupils of his, but he knew them individually, he knew the work which they did, and he could testify to the thoroughness and the heartiness with which they did it. He had great pleasure in moving the resolution.

Mr. VANDERPANT seconded the resolution which was carried by acclamation.

Mr. ROBBINS briefly responded on behalf of the officers.

The PRESIDENT tendered the thanks of the Society to Mr. Cunningham for his paper, and to those members who had brought forward casual communications.

Dental News.

ROYAL COLLEGE OF SURGEONS, EDINBURGH.

The following were the written questions at the recent First Examination for the L.D.S.

Chemistry.

Two questions only to be answered.

1. Give the chemical composition of Gypsum. How is it converted into Paris Plaster? and state what occurs when it sets.
2. Mention the properties of Alloys and give three examples.
3. How is Hydrogen prepared? Give its properties.

Anatomy.

Two questions only to be answered.

1. Give the anatomical characteristics of a sternal rib.
2. Give the general anatomy of the heart, and the different structures entering into its construction and their uses.
3. Give the muscles of the Pharynx, their origin, insertion and action.

Physiology.

One question only to be answered.

1. Give the different functions of the liver.
 2. Describe the microscopic structure found in an ordinary cerebro spinal nerve fibre.
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A COUNTY COURT CASE.

At Penzance County Court, on the 20th ult., his honour Judge Granger concluded the hearing of a case in which James Mills Cara, dentist, sued George Hush, draper, to recover £1 for professional services and a set of teeth. The Plaintiff's case was concluded at the last Court, and that of the Defendant commenced. Amongst additional evidence now brought for the defence was that of Mr. A. J. Watts, Demonstrator of Dental Mechanics at the London Dental Hospital. He testified that the denture supplied was unwearable, and could not have been made wearable. His Honour, in giving judgment for the Defendant, said he had come to the conclusion that there was no obligation upon the Defendant to wear the teeth both day and night, and he was also of opinion that they did not fit.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents]

To the Editor of the "British Journal of Dental Science."

HOSPITAL ABUSE.

SIR.—I wish to draw your attention to the following facts. A patient came to my surgery while I was taking holiday and not caring to see my ocum tenens, went to a Dental Hospital where she had a tooth stopped.

The student who operated noticed that there were two teeth necessary to complete the upper case, (she was wearing a platina partial upper) told her to go round to his house, a few minutes' walk, that afternoon and he would attend to the dentine. She went, as appointed, and this student added two teeth to the case in rubber, and charged her two guineas which she paid, and for which she holds the receipt.

Now, Sir, I contend that such proceedings should not be tolerated. The case was rendered useless and I have advised recourse to a solicitor for recovery of the amount, and damages for destruction of denture.

Are the Hospital authorities aware that a student is thus acting under the "cover" of the Hospital? Is not the student guilty of illegally acting as a dentist?

If such proceedings are allowed, a student could make his term pay well if he took rooms near his Hospital, and sent patients there after seeing them in the Hospital.

Truly yours,

L. D. S.

* * * We recommend our correspondent to communicate the above facts to the authorities of the Hospital.—Ed. B. J. D. S.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
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British Journal of Dental Science.

No. 664. LONDON, SEPT. 16, 1895. VOL. XXXVIII.

ORAL SURGERY.

By EDMUND W. ROUGHTON, B.S., M.D. (Lond.), F.R.C.S.
Eng.

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(Continued from page 786.)

ACUTE ALVEOLAR ABSCESS.

When pyogenic bacteria escape from the apical foramen and set up inflammation which goes on to suppuration, the result is an alveolar abscess. There are other causes, (such as a suppurating dentigerous cyst) which may lead to the formation of pus in or near the alveolus, but it is well to limit the term "alveolar" to those abscesses directly due to suppurative apical periodontitis.

The pus is at first confined within the apical space under considerable pressure, the result being that the surrounding bone undergoes absorption, the process being rapid in the cancellous tissue but receiving a temporary check when the compact bone is reached ; thus it happens that a cavity of some size may be formed within the alveolus before a vent is established. (See Fig. 14). The interior of the abscess

cavity is lined by the swollen and softened peridental membrane loosened from its bony attachment, but still adherent to the root of the tooth, forming the little pus-sac so often seen attached to the extremities of teeth extracted for this condition. Obedient to the law that pus travels in the direction of least resistance, the abscess in most cases penetrates the outer lamina of compact tissue, for that is the thinner of the two, and so comes to point upon the buccal aspect of the jaw. The invasion of the soft tissues covering the bone is

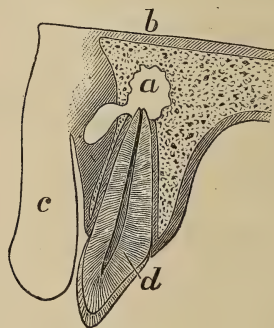


Fig. 14.—Acute alveolar abscess pointing on the gum. (a) Abscess cavity in cancellous tissue. (b) Floor of nose. (c) Lip. (d) Tooth.
(From the American System of Dentistry).

accompanied by considerable inflammatory œdema extending to the mucous membrane of the mouth and the tissues of the cheek. The pus travels rapidly through the softened tissues and evacuates itself inside the mouth or upon the face. In cases of acute alveolar abscess the opening is usually through the gum immediately over the affected root, but sometimes the periosteum becomes extensively separated from the bone, the pus accumulates between the two and eventually finds its way to the surface at the margin of the gum; such extensive detachment of periosteum is very apt to lead to necrosis of the underlying bone, especially in the case of the

mandible ; it is this class of abscess which is particularly prone to point upon the face, the opening being just below the chin when the trouble has started from one of the front teeth, or at the lower border of the cheek when in connection with a molar. Such abscesses when starting from an upper incisor, not unfrequently burrow beneath the periosteum of the palate producing a soft hemispherical swelling ; in these cases the pus has not the same tendency to escape at the margin of the gum owing probably to the greater thickness and closer attachment of the muco-periosteum to the bone. Despite the extensive detachment of periosteum, necrosis of the palate is not so frequent as might be expected, the bone

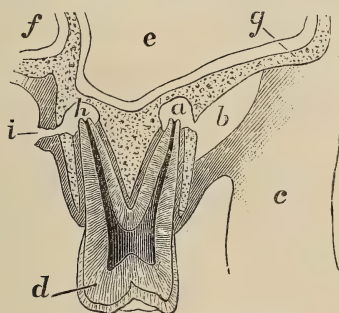


Fig. 15.—(a) Abscess cavity in bone. (b) Collection of pus between bone and periosteum. (c) Cheek. (d) Tooth. (e) Antrum. (f) Nasal cavity. (g) Malar process. (h) Abscess discharging on palate at (i). (From the *American System of Dentistry*.)

being able to maintain its vitality by the blood supply it derives from its nasal or antral aspects ; but extensive necrosis does sometimes occur. An abscess in connection with the buccal roots of an upper molar may burrow between the periosteum and the bone and open upon the cheek just under the malar prominence. (See Figs. 15 and 16*).

In another class of cases the pus may travel directly into a neighbouring cavity as the nostril or antrum. (Fig. 18*).

* On account of want of space these Figures will appear in October 1st Journal.

In a few cases the pus finds its way to the surface along the side of the tooth travelling between the latter and its socket.

Symptoms. The symptoms of acute alveolar abscess are always preceded by those of acute local periodontitis already described. With the onset of suppuration the pain becomes more severe and of a throbbing character; the severity of the pain is due to the great tension under which the inflammatory products are pent up. The gum over the affected tooth becomes red, swollen and tender to the touch; the face is at first not much swollen; the submaxillary lymphatic glands are often enlarged and tender. Accompanying the local symptoms, there is often great constitutional disturbance, the temperature rising perhaps as high as 103 deg. or 104 deg. F., and being attended by febrile symptoms of proportionate severity.

When the pus escapes from the bone the pain abates considerably but does not cease; the swelling of the gum increases and softens at its most prominent point, and if large enough fluctuates; the swelling of the face increases very much so that the features may be greatly distorted.

When the abscess bursts or is opened, all the symptoms abate very rapidly, the fever subsides, the pain stops, the swelling of the face goes down and the gum reverts to its normal condition with the exception of a small opening through which pus continues to exude for a longer or shorter time; under efficient treatment the discharge soon ceases, but if the source of irritation remains the discharge becomes chronic.

It must be borne in mind that although the great majority of cases terminate favourably, even when untreated, yet a few cases are attended by disastrous and even fatal results. The submaxillary glands may suppurate, especially in strumous

subjects, leading to serious illness and much subsequent deformity from scarring. The pus from an alveolar abscess may wander into the pterygoid region, there causing septic thrombosis which may extend through the foramina at the base of the skull to the cavernous sinus. Pearce Gould records such a case which proved fatal. Howse records a case of pyæmia following on an alveolar abscess of the lower jaw in a child, and Arbuthnot Lane records another case with pyæmic thrombosis of the veins of the neck terminating fatally. Heath mentions two cases of diffuse cellulitis of the neck leading to fatal cedema of the larynx.

Treatment. Two indications must be fulfilled (*a*) The pus must be evacuated and (*b*) the cause of the trouble (the septic matter in the pulp chamber and apical space) must be removed.

(*a*) In cases which come under the care of the dental surgeon before swelling of the gum has occurred, the pulp chamber should be opened, the root canals cleared out, and the pus evacuated through the tooth. When the pus has perforated the external plate of the jaw, and has formed a swelling on the gum, the latter should be freely incised, the incision being carried if possible through the bony wall of the abscess. Collections of pus beneath the periosteum of the palate should be freely and early incised so as to diminish the risk of necrosis. Every means should be taken to prevent the formation of an opening on the face; the external use of poultices and fomentations should be strictly forbidden; even when the skin is reddened, and pointing on the face appears inevitable this untoward result may often be averted by painting the surface with flexible collodion, and making a free opening in the mouth. In the event of suppuration extending to the cellular tissue of the neck, free incisions should be made, having due regard to the anatomical position

of important structures. Œdema of the larynx would necessitate scarification of the aryteno-epiglottic folds, or laryngotomy. The only effectual treatment of pyæmic thrombosis, is to dissect out the affected veins; this must be done as soon as possible, or the process may have extended beyond the reach of surgical interference; this was done by Mr. Arbuthnot Lane in the case mentioned above, but unfortunately too late, the septic matter having already become disseminated throughout the circulation.

(b) The best way of removing the septic matter from the pulp chamber and apical space will vary in different cases. If the tooth in question is one which cannot be rendered useful if retained, the sooner it is extracted the better. If on the other hand the tooth can be rendered useful, although dead, it should be saved, provided the patient can obtain efficient and appropriate treatment at the hands of a dental surgeon. The object of such treatment is to render the pulp cavity and apical space aseptic; the methods of obtaining this result being entirely within the province of dental surgery will not be referred to here.

Constitutional treatment is in most cases limited to the use of saline aperients and remedies for the relief of pain, but in the more severe cases, especially when attended by complications, the constitutional treatment assumes more importance, and must be conducted on general principles.

To be continued.

ARTIFICIAL LEATHER.—The *Revue Industrielle* gives the following recipe:—Take vegetable parchment—*i.e.* paper or cellulose treated by sulphuric acid—roll it while still damp with paraffin wax and stearine, and add a little glycerine and chloride of calcium to ensure suppleness; dry, size, and varnish.

British Journal of Dental Science.

LONDON, SEPTEMBER 16, 1895.

THE NEW STUDENT.

Although there is now no special reason for the commencement of the professional curriculum dating from the month of October, yet, as a matter of fact, this is still regarded as the orthodox period. More as a conformity to custom, therefore, the present number of the JOURNAL contains all the information with respect to Schools, and the regulations of Examining Bodies, which is of interest to those entering upon the Hospital course. A student entering now, can complete the necessary two years' Lectures and Practice in good time for the November Examination, but the same arrangement holds good for the May examination for those who enter at the commencement of a Summer Session.

There is but little additional information to be given this year to the dental student, and what there is refers more to Examinations than to Schools. Perhaps the most interesting point, and one which will conduce to steady work, is with reference to failure at the Examination at the Royal College of Surgeons of England. A new rule has come into force which obliges a rejected candidate to produce certificates from his teachers (whether at the General or the Dental Hospitals) showing that a further period of work has been undertaken, before he can present himself for re-examination. This will necessarily mean an additional expenditure in the shape of fees, and should act as a stimulus for thorough preparation at the first attempt. The question of Dental Mechanics, too, is one which has recently received much attention. It will be remembered that many

of the Teaching Bodies approached the College of Surgeons suggesting that a separate examination in this subject should be instituted at the close of the pupilage, so that the student would have proved himself efficient in this branch before commencing Hospital work. We believe, however, that certain practical difficulties have been found to exist which prevent such a scheme coming into force. One reason, perhaps, is that it would place the pupil of a country practitioner at a disadvantage with a pupil who is in a centre where there is a dental school. Under existing circumstances the latter is able to commence his hospital training whilst he is still finishing his "pupilage," for it is well-known that many complete both pupilage and studentship within the four years demanded by the General Medical Council from the date of registration. This somewhat lax state of things may receive attention sometime, but meanwhile we shall be prepared to find that the College may see its way to examine the candidate in Mechanics (and perhaps some other subjects which are at present not included), before he presents himself for what would then become a second, and final, examination in the ordinary Hospital subjects.

✓ We must also remember that the General Medical Council has appointed a visitor to attend, and report upon, the examinations of the various licensing authorities. This will probably tend to produce a "levelling-up" if there is a need for this anywhere, and the subject of dental mechanics will doubtless receive attention. According to many, the present methods of instruction in that subject frequently leave much to be desired. We have already hinted that in the future the practitioners who accept the responsibility of instructing pupils will have to face systematic competition. As far as we can see, the probable evolution of the Dental Schools will include instruction in Mechanical Dentistry, in which case the pupil would pass from the Laboratory to the Extraction and Stopping Rooms, and a complete course of Dental Instruction would be organised under one roof. This

scheme is already in existence in at least one of the recognised schools. In addition we have, too, a special Institution of Dental Technics in London, to which we have already drawn attention, designed upon lines which it is claimed will produce the best results in the shortest time, and which by a carefully worked-out system should leave little to chance.

PHOTOMICROGRAPHY. Since microscopists have brought photography to their aid much useful and interesting work has been done. Amidst the struggle for the best lenses and various methods of illumination there has descended a photomicrographic thunderbolt. Professor Hunter, of Edinburgh, has recently astonished some of our operators. He derives his light from an ordinary candle. A lens placed in front of this transmits not the image of the flame but the rays of light through a spherical glass globe filled with water. This collects the outlying rays, and a beam of light is thrown (through a lens fastened to the glass sphere) upon the object on the stage of the microscope. The Professor says that with quite an ordinary microscope object-lens he thus obtains far better results than with better lenses and the ordinary methods of illumination. There is no "flare" in the centre of the field, and if coloured screens are desired they can be obtained by filling the glass globe with coloured water. He certainly showed upon the screen some wonderful lantern slides prepared in the manner described.

TO MEND A BROKEN CABLE.—Dr. W. H. Steele recommends the following method of repairing a broken engine-cable; in fact he says the fractured part will be made stronger than the rest. A piece of brass should be bent in the shape of a tube of a proper size to fit over the broken ends of the cable. After these are thoroughly cleaned they should be slipped into the tube and soldering acid applied. A piece of jeweller's soft solder is then laid along the open joint of the tube and upon heating over a spirit lamp the three pieces are fixed together. The surplus

solder and all sharp corners are next trimmed off and the operator has got himself out of a difficulty.

INFANTILE SCURVY.—At the meeting of the Ontario Medical Association, Dr. H. T. Machell narrated the case of an infant eleven months old. The first symptom was an inability to use the legs and feet as well as usual, and there was pain about the hip-joint. The child had been fed on oatmeal gruel, and had not lost flesh. A reddish blush about the right ear and petechiæ between the knees and ankles were next noticed; a week later the symptoms were worse, the gums of the four upper incisors were swollen and purple, and the skin of the thighs and legs became shining. Upon a diet of grape-juice the child began to improve, and in five days the swelling and tenderness of the legs disappeared; the gums were perfectly normal two days later.

VACANCY.

The Victoria Dental Hospital, Manchester. The post of House Dental Surgeon is vacant. Applications and testimonials to be made to the Honorary Secretary.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
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BRITISH JOURNAL OF DENTAL SCIENCE.

DENTAL STUDENTS' SUPPLEMENT.

SEPTEMBER 16TH, 1895.

I.—THE LICENSING CORPORATIONS.

Comparative Summary of Regulations for the Licence in Dental Surgery.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Faculty of Physicians and Surgeons, Glasgow.	Royal College of Surgeons Ireland.
1—PRELIMINARY EXAMINATION.....	Compulsory on all who commenced their Professional Education after July 22nd, 1878. Must be registered as a Dental Student at the office of the General Medical Council, 299, Oxford St., London, W.	Compulsory on all who commenced their Professional Education after July 22, 1878.	Compulsory on all who commenced their Professional Education after August 1st, 1878.	All Examinations in General Education recognised by the General Medical Council.
2—Age at which the Candidate may present himself	Twenty-one.	Twenty-one.	Twenty-one.	Any age, but diploma cannot be granted until he is twenty-one.
3—DURATION OF PROFESSIONAL EDUCATION.....	Four years subsequent to registration.	Four years.	Four years.	Four years.
4—COURSES OF LECTURES, &c., to be attended at a recognized School :—	One course.	One Winter course.	One course of 6 months.	One course.
Anatomy	Ditto.	One course of 6 months.*	One course of 6 months.	One course.
Physiology	Ditto.	One Winter course.	One course of 6 months.	One course.
Practical Physiology	Ditto.	...	...	Ditto.
Surgery	Ditto.	...	...	Ditto.
Medicine	Ditto.	...	...	Ditto.

Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Faculty of Physicians and Surgeons, Glasgow.	Royal College of Surgeons, Ireland.
Chemistry.....	Instruction.	One course.	One course.
Materia Medica	Instruction.	Ditto.	One course.
Dissections and Demon- strations	Twelve months.	Twelve months.	Two courses.
Practical Chemistry and Metallurgy	Instruction.	One course.	1 course. Three months.
Practice of Surgery	Two Winter Sessions.	One course of 6 months.	1 course. Six months.
Clinical Lectures in Hos- pital	Two Winter Sessions.	Two courses of 12 months	One year.
Dental Anatomy and Phy- siology	Two courses.	24 Lectures (Six months.)	One course.
Dental Surgery and Path- ology	Ditto.	20 Lectures.	Two courses.
Metallurgy	One course.	...	One course.
Dental Mechanics	One course.	Demonstrations.	Two courses.
Practical Instruction in Mechanical Dentistry...	Three years under a regis- tered Dental Practitioner, all of which may be pre- vious to Registration.	Three years under a Regis- tered Dental Practitioner- er.	Three Years under a Regis- tered Dentist.
Practice of Dental Surgery in a recognized Dental Hospital, or in the Dental Department of a recog- nized General Hospital	Two years.	Two years.	Two years.
5—Fee	£10 10s. over and above the stamp duty.	£10 10s.	£21.
6—Least period during which unsuccessful Can- didates are referred to their studies	Six months, subject to the decision of the Board.	Six months.	Three months.

7--PARTICULARS OF EX-
AMINATION

(A) *Written:*
On General Anatomy and
Physiology, General
Pathology and Surgery,
Dental Anatomy and
Physiology, and Dental
Pathology and Surgery.

(B) *Practical.*
(1) On the treatment of Dental Caries, and may be required to prepare and fill cavities with Gold or Plastic filling or material, or to do any other operation in Dental Surgery.

(Candidates must provide their own instruments.)

(2) On the Mechanical and Surgical treatment of the various irregularities of children's teeth.

(3) On Mechanical Dentistry.

(c) *Oral.* Comprises the several subjects included in the curriculum of professional education, and is conducted by the use of preparations, casts, drawings, &c. May and November.

8-DATES OF EXAMIN-
ATIONS

For further information
apply to

Written and Oral:

First Part—Anatomy, Chemistry, Physiology.

Second Part—Surgery, Medicine, Therapeutics, and special subjects, and of Dental Anatomy and Physiology, Dental Surgery & Pathology, and Dental Mechanics, Registered Medical Practitioners are examined on the special subjects only. Practical Examination given in a Dental Hospital in Dental Surgery, Pathology & Mechanics.

First examination. —

Second exam. on Thursday following.

JAS. ROBERTSON, Solicitor,
Clerk of College,
1, George Square, Edin.

Written, Oral & Practical:
1st part—Anatomy, Physiology, Chemistry, and Metallurgy.

Second Part—Surgery,
Medicine, Materia Medi-
ca, and special Dental
subjects.

Practical Examination at a Dental Hospital. Candidates are to bring Extractor, Files, and Plugging Instruments.

Also practical Examination in Mechanical Dentistry.

SINE CURRICULO:—

Candidates in practice before July, 1878, and whose names are on a Dental Register are admitted to the examination *Sine Curriculo*. Fee £26 5s.

Feb. May & Nov.

1895 October 9—11.
1896 April 8—10.

ALEX. DUNCAN, Esq.,
Faculty of Physicians
and Surgeons,
Glasgow.

The Registrar,
Royal College of
Surgeons, Dublin.

II. PRELIMINARY EXAMINATION.

REGULATIONS OF THE GENERAL MEDICAL COUNCIL.

No person shall be allowed to be registered as a Medical or Dental Student unless he shall have previously passed (at one or more Examinations) a preliminary Examination in the subjects of General Education as specified in the following List:—

* * Regulations in operation from January 1, 1892.

- (a) English Language, including Grammar and Composition.
- (b) Latin, including Grammar, Translation from specified authors, and translation of easy passages not taken from such authors.
- (c) Mathematics, comprising (a) Arithmetic; (b) Algebra, as far as Simple Equations, inclusive; (c) Geometry, the subject matter of Euclid, Books I., II., and III., with easy deductions.
- (d) One of the following optional subjects:—
 (a) Greek, (b) French, (c) German, (d) Italian, (e) any other Modern Language, (f) Logic.

List of Examining Bodies whose Examinations fulfil the conditions of the Medical Council as regards Preliminary Education, and entitle to registration as Medical or Dental Students.

I. UNIVERSITIES IN THE UNITED KINGDOM.

UNIVERSITY OF OXFORD:—

1. Junior Local Examinations; Certificate to include Latin and Mathematics, and also one of the following optional subjects, Greek, French, German.
2. Senior Local Examinations; Certificate to include Latin and Mathematics.
3. Responsions.
4. Moderations.
5. Examination for a degree in Arts.

UNIVERSITY OF CAMBRIDGE:—

6. Junior Local Examinations; Certificates to include Latin and Mathematics, and also one of the following optional subjects:—Greek, French, German.
7. Senior Local Examinations; Certificate to include Latin and Mathematics.
8. Higher Local Examinations.
9. Previous Examination.
10. Examination for a Degree in Arts.

* * The Council will not in future accept any Certificate of pass in Preliminary Examination in General Education, unless the whole of the subjects included in the Preliminary Examination required by the Council for Registration of Students of Dentistry have been passed at the same time; but this rule shall not apply to those who, previous to January 1, 1892, have passed a part of any Preliminary Examination recognized by the Council.

Provided that a University Examination required for graduation in Arts, wherein the specified subjects of General Education are included, may be recognized for the purpose of registration.

UNIVERSITY OF DURHAM:—

11. Examination for Certificate of Proficiency.
12. Examination for Students at the end of their first year.
13. Examination for a Degree in Arts.

UNIVERSITY OF LONDON:—

14. Matriculation Examination.
15. Preliminary Scientific (M.B.) Examination.
16. Examination for a Degree in Arts or Science.

VICTORIA UNIVERSITY:—

17. Preliminary Examination; Latin to be one of the subjects.
18. Entrance Examination in Arts, to include all the subjects required.

UNIVERSITY OF WALES:—

19. Matriculation Examination. The whole of the Examination to be passed at the same time, and to include one of the optional subjects required by the Council.

UNIVERSITY OF EDINBURGH:—

20. Local Examinations (Junior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—Greek, French, German.
21. Local Examination (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—Greek, French, German.
22. Preliminary Examination for graduation in Science or Medicine and Surgery.
23. Examination for a Degree in Arts.

UNIVERSITY OF ABERDEEN:—

24. Local Examinations (Junior Certificate); Certificate to include all the subjects required.
25. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—Greek, French, German.
26. Preliminary Examination for graduation in Medicine and Surgery.
27. Examination for a Degree in Arts.

UNIVERSITY OF GLASGOW:

28. Local Examinations (Junior Certificate); Certificate to include all the subjects required.
29. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following subjects:—Greek, French, German.
30. Preliminary Examination for graduation in Medicine or Surgery.
31. Examination for a Degree in Arts.

UNIVERSITY OF ST. ANDREWS:—

32. Local Examination (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—Greek, French, German.
33. Local Examinations (Junior Certificate); to include all the subjects required.
34. Preliminary Examination for graduation in Medicine or Surgery.
35. Examination for a Degree in Arts.

UNIVERSITY OF DUBLIN.

36. Public Entrance Examination.
37. General Examination at end of Senior Freshman year.
38. Examination for a Degree in Arts.

ROYAL UNIVERSITY OF IRELAND:—

39. Matriculation Examination.

OXFORD AND CAMBRIDGE SCHOOLS' EXAMINATION BOARD:—

40. Certificate, to include the following subjects, an adequate knowledge of English Grammar and Orthography, as shown in the course of the Examination, to the satisfaction of the Examiners, being held as conforming to the requirements of the Medical Council in regard to those subjects:
 - (a) Arithmetic, including Vulgar and Decimal Fractions;
 - (b) Algebra, including Simple Equations;
 - (c) Geometry, including the subjects of the first three books of Euclid;
 - (d) Latin, including Translation and Grammar;
 - (e) Also one of these optional subjects, (Greek, or any Modern Language or Logic.)

II.—OTHER BODIES NAMED IN SCHEDULE (A) TO THE “MEDICAL ACT.”

*APOTHECARIES' SOCIETY OF LONDON:—

41. Examination of Arts.

ROYAL COLLEGES OF PHYSICIANS AND SURGEONS OF EDINBURGH:—

42. Preliminary (combined) Examination in General Education.

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW:—

43. Preliminary Examination in General Education.

*ROYAL COLLEGES OF PHYSICIANS AND SURGEONS IN IRELAND.—

44. Preliminary Examination; Certificate to include Mathematics.

III.—EXAMINING BODIES IN THE UNITED KINGDOM NOT INCLUDED IN SCHEDULE (A) TO THE “MEDICAL ACT” (1858).

COLLEGE OF PRECEPTORS:—

45. Examination for a First Class Certificate, or Second Class Certificate of First or Second Division, Algebra, Geometry, Latin, and either a Modern Language, or Greek, or Logic, having been taken.
46. Preliminary Examination for Dental Students.

* The Council has recommended that these Examinations be discontinued.

INTERMEDIATE EDUCATION BOARD OF IRELAND :—

- | | |
|------------------------------|---|
| 47. Junior Grade Examination | } Certificate in each case to include
all the subjects required. |
| 48. Middle Grade Examination | |
| 49. Senior Grade Examination | |

EDUCATIONAL INSTITUTE OF SCOTLAND :—

50. Preliminary Medical Examination.

SCOTCH EDUCATIONAL DEPARTMENT :—

51. Leaving Certificates in each Grade and in Honours.

IV.—INDIAN, COLONIAL, AND FOREIGN UNIVERSITIES AND COLLEGES.

REGISTRATION OF DENTAL STUDENTS.

Every Dental Student shall be registered in the manner hereinafter prescribed by the General Medical Council.

No Dental Student shall be registered until he has passed a Preliminary Examination, as required by the General Medical Council, and has produced evidence that he has commenced Dental Study.

The commencement of the course of Professional Study recognised by any of the Qualifying Bodies shall not be reckoned as dating earlier than fifteen days before the date of Registration.

Every person desirous of being registered as a Student shall apply to the Branch Registrar of the division of the United Kingdom in which he is residing, according to the prescribed form, which may be had on application to the several Qualifying Bodies, Dental Schools, and Hospitals ; and shall produce or forward to the Branch Registrar a Certificate of his having passed a Preliminary Examination, as required by the General Medical Council, and evidence that he has commenced Dental Study.

Students who commenced their professional education by apprenticeship to Dentists entitled to be registered, or by attendance upon professional lectures before July 22nd, 1878, (when Dental Education became compulsory,) shall not be required to produce evidence of having passed a Preliminary Examination.

Candidates for a Diploma in Dental Surgery shall produce certificates of having been engaged during four years in Professional Studies, and of having received three years' instruction in Mechanical Dentistry from a registered Practitioner.

One year's *bona fide* apprenticeship with a registered Dental Practitioner, after being registered as a Dental Student, may be counted as one of the four years of professional Study.

The three years of instruction in Mechanical Dentistry, or any part of them, may be taken by the Dental Student either before or after his registration as a Student ; but no year of such mechanical instruction shall be counted as one of the four years of Professional Study unless taken after registration.

III. EDUCATIONAL BODIES.

LONDON.

DENTAL HOSPITAL OF LONDON, AND LONDON SCHOOL OF DENTAL SURGERY, LEICESTER SQUARE.

DENTAL AND MEDICAL OFFICERS.

Consulting Physician :—

Sir RICHARD QUAIN, Bart., F.R.S., M.D., F.R.C.P., LL.D.

Consulting Surgeon—CHRISTOPHER HEATH, F.R.C.S.

Consulting Dental Surgeon:—

T. ARNOLD ROGERS, M.R.C.S., L.D.S.

Dental Surgeons.

STORER BENNETT, L.R.C.P., F.R.C.S., L.D.S.

C. E. TRUMAN, M.A. Cantab., M.R.C.S., L.D.S.

LEONARD MATHESON, L.D.S.

E. LLOYD WILLIAMS, M.R.C.S., L.R.C.P., L.D.S., L.S.A.

W. B. PATERSON, F.R.C.S., L.D.S.

W. H. WOODRUFF, L.D.S.

Assistant Dental Surgeons.

A. CLAYTON WOODHOUSE, M.R.C.S., L.D.S.

F. J. BENNETT, M.R.C.S., L.D.S.

J. F. COLYER, M.R.C.S., L.R.C.P., L.D.S.

C. F. RILOT, M.R.C.S., L.D.S.

H. BALDWIN, M.R.C.S., L.D.S.

H. LLOYD WILLIAMS, M.R.C.S., L.D.S.

W. H. DOLAMORE, L.R.C.P., M.R.C.S., L.D.S.

PERCY SMITH, L.R.C.P., M.R.C.S., L.D.S.

G. HERN, L.R.C.P., M.R.C.S., L.D.S.

J. G. TURNER, L.R.C.P., F.R.C.S., L.D.S.

A. R. COLYER, L.R.C.P., M.R.C.S., L.D.S.

Anæsthetists.

G. H. BAILEY, M.R.C.S.

W. DUDLEY BUXTON, M.D., B.S. Lond., M.R.C.P. Lond.

FREDERIC W. HEWITT, B.A., M.D. Cantab.

CARTER BRAINE, F.R.C.S.

Assistant Anæsthetists.

HENRY DAVIS, M.R.C.S., L.S.A.

GEORGE ROWELL, F.R.C.S.

E. A. BRIDGER, M.D.

B. H. COMERFORD, M.R.C.S., L.R.C.P.

Demonstrators.

T. H. CLARENCE, L.D.S.

E. GARDNER, L.D.S.

W. J. MAY, L.D.S.

A. B. DENSHAM, M.R.C.S., L.R.C.P., L.D.S.

Medical Tutor—W. H. DOLAMORE, M.R.C.S., L.R.C.P., L.D.S.*Curator of Mechanical Laboratory.*

A. J. WATTS, L.D.S.I.

Demonstrations.—Demonstrations will be given every morning during the early part of each Session ; and at the end of the Course those Gentlemen who have attended the Demonstrations to the satisfaction of the Staff, will be permitted to perform operations at the Hospital under the supervision of the Medical Officers and the House Surgeon.

Dresserships for Cases of Extraction.—The appointments are held for one month, and consist of six senior Dresserships for extractions under anæsthetics and eighteen Junior Dresserships for ordinary extractions.

The Senior Dressers will be selected from those pupils only who have entered fully both to the practice and lectures of this Hospital, and also to the Course required by the College of Surgeons for the Licence in Dental Surgery at one of the General Hospitals.

A new Mechanical Laboratory has been fitted up and opened in which Demonstrations are given by the Lecturer on Mechanical Dentistry, on Continuous Gum Work, Making Obturators, and the Mechanical Treatment of Acquired and Congenital Cleft Palate, Pivoting, Bridge and Bar Work, &c., and the Students are enabled to make plates for the treatment of Irregularities and of Cleft Palate.

The Hospital is lighted throughout by electricity. The New Mechanical Laboratory is now open. The Laboratory is carefully fitted with all the requirements of a modern Dental Laboratory, and is lighted with Electric Light for foggy weather. Each bench is also well lighted by daylight. The workroom is under the superintendence of A. J. WATTS, L.D.S.I., who will attend daily from 9 a.m. to 6 p.m. to give practical instructions to students.

The WINTER SESSION will commence on October 1st, 1895.

The SUMMER SESSION will commence 1st May, 1896.

LECTURES.

Dental Surgery and Pathology.—Mr. STORER BENNETT.

Dental Anatomy and Physiology (Human and Comparative).—

Mr. ARTHUR UNDERWOOD.

Mechanics of Dentistry.—Mr. DAVID HEPBURN.

Metallurgy in its application to Dental Purposes.—Dr. FORSTER MORLEY.

MEDICAL TUTOR.

The Medical Tutor attends four days in the week, from 5 to 7 p.m., for two months previous to the Annual Examinations. His classes are open to all Students, and are intended to assist those who are preparing for their examinations at the College of Surgeons ; generally speaking, to guide and direct the studies of the pupils, and prepare them in the subjects for the Examinations.

FEES.

Fee for the Special Lectures and Hospital Practice required by the Curriculum, £50 in one payment, or 50 Guineas in two yearly instalments.

An extra fee of seven guineas will be payable for every extra six months' Hospital Practice.

All fees are payable on day of entry.

FEES FOR SINGLE COURSES.

				£	s.	d.
Dental Anatomy and Physiology,	One Course	...	...	5	5	0
"	Two Courses	...	...	8	8	0
Dental Surgery,	One Course	...	...	5	5	0
"	Two Courses	...	...	8	8	0
Dental Mechanics,	One Course	...	...	5	5	0
"	Two Courses	...	...	8	8	0
Metallurgy,	One Course	...	...	5	5	0
"	Two Courses	...	...	8	8	0

Qualified Medical Men or Gentlemen holding Foreign Diplomas to practise in their native country, can receive six months' practical instruction in the Hospital, fee 20 guineas.

The Medical Committee reserve to themselves the right to refuse any such candidates' application.

Students who perform Operations for Filling Teeth must provide their own Instruments for the same, the proximate cost of which is £25; a list can be had on application, but "The Kit" has been very carefully selected with a view to efficiency, and is well adapted for use in future practice.

Further particulars may be obtained on application to the Dean, who attends at the Hospital every Wednesday from 10 a.m. to 12 noon.

PRIZES.

The Prize-day is held in July.

1. A Scholarship of the value of £20 has been founded by Sir Edwin Saunders, and will be awarded at the close of each Summer Session.

2. Prizes are awarded by the Lecturer for the best examinations in the subjects in their respective courses, at the end of the Summer and Winter Sessions.

3. Prize in Operative Dentistry, in the competition for which each candidate is entrusted with the care of a mouth, which he shall, if not impracticable, set thoroughly in order.

4. A prize of the value of five guineas is also given by Messrs. Ash & Sons for the best essay on a surgical subject connected with the mouth.

Note.—The Medical Committee have resolved "that the holder of the Saunders Scholarship be admitted without additional fee to the extra year of Hospital Practice."

The Dean requests that all communications relating to the Medical School may be addressed to him at the Hospital, where he will attend in the afternoons, from Sept. 26th to Oct. 2nd inclusive, from 5 till 6 o'clock, and on Wednesday mornings from 10.30 till 12.

MORTON SMALE, M.R.C.S., L.D.S., M.S.A., *Dean.*

NATIONAL DENTAL HOSPITAL AND COLLEGE,
GREAT PORTLAND STREET, W.

FOUNDED 1861.

HOSPITAL STAFF.

Consulting Physicians.

Sir W. H. BROADBENT, Bart., M.D., F.R.C.P.

Sir B. W. RICHARDSON, M.A., M.D., F.R.S.

Consulting Surgeons.

Sir SPENCER WELLS, BART., F.R.C.S. CHRISTOPHER HEATH, F.R.C.S.

Consulting Dental Surgeon.

SIR EDWIN SAUNDERS, F.R.C.S.

Hon. Visiting Physician.

JAMES MAUGHAN, M.D.

Hon. Visiting Surgeon.

E. W. ROUGHTON, F.R.C.S., &c.

Dental Surgeons.

Monday	...	F. HENRI WEISS, L.D.S. Eng.
Tuesday	...	ALFRED SMITH, L.D.S. Eng.
Wednesday	...	MARCUS DAVIS, L.D.S. Eng.
Thursday	...	A. F. CANTON, L.D.S. Eng.
Friday	...	H. G. READ, M.R.C.S., L.R.C.P., L.D.S. Eng.
Saturday	...	C. W. GLASSINGTON, M.R.C.S., L.D.S. Edin.

Assistant Dental Surgeons.

Monday	...	WILLOUGHBY WEISS, L.D.S. Eng.
Tuesday	...	EDGAR BEVERLEY, L.D.S. Eng.
Wednesday	...	SIBLEY W. READ, L.D.S. Eng.
Thursday	...	T. G. READ, L.D.S. Eng. D.M.D.
Friday	...	W. RUSHTON, L.D.S. Eng.
Saturday	...	W. H. WHEATLEY, L.D.S. Eng.

Anæsthetists.

Monday	...	C. H. COZENS, M.R.C.S., L.R.C.P.
Tuesday	...	W. REID HOLMES, M.D., M.C.
Wednesday	...	C. J. OGLE, M.R.C.S., L.S.A.
Thursday	...	G. EVERITT NORTON, M.R.C.S., L.S.A.
Friday	...	JAMES MAUGHAN, M.D.
Saturday	...	HAROLD LOW, M.A., M.B. Camb.

House Surgeons.

F. M. FARMER, L.D.S. Eng.

W. F. PEDLER, M.R.C.S., L.D.S. Eng.

LECTURERS.

<i>Dental Anatomy and Physiology</i>	J. W. PARE, M.D. Edin., L.D.S. Eng.
<i>Dental Surgery and Pathology</i>	Vacant.
<i>Dental Mechanics</i>	HARRY ROSE, L.D.S. Eng.
<i>Dental Metallurgy</i>	W. LAPRAIK, Ph.D, F.I.C., F.C.S.
<i>Operative Dental Surgery</i> ...	GEORGE CUNNINGHAM, M.A., L.D.S. Eng., D.M.D.
<i>Dental Materia Medica</i>	C.W. GLASSINGTON, M.R.C.S., L.D.S. Edin.
<i>Elements of Histology</i>	J. MAUGHAN, M.D.

At present the Hospital is open for the reception of patients every week-day, from 9 o'clock till 11 o'clock a.m. Work is continued till 2 o'clock p.m. and a proposal to open the hospital in the afternoon is under consideration.

The accommodation and fittings are in accordance with the latest requirements for efficient teaching in all branches of the Science and Art of Dental Surgery.

The Conservation Room, with space for sixty chairs, is well lighted and warmed and ventilated after approved methods.

Other large rooms are arranged as a Mechanical Laboratory, Special Demonstration Room, Students' Common Room, &c.

There are also a Metallurgical Laboratory, Library and Museum. The Waiting Rooms, Extraction Rooms and Lecture Hall are on the ground floor.

The building is lighted throughout by electricity, and there is also a current for motors in the Stopping Room.

Each Student on entering the School passes through a preliminary course under the care of a Demonstrator, and all the members of the Staff take part in chair-side teaching, besides giving special demonstrations.

Dresserships in the Extraction Rooms.

These appointments are re-arranged every two months. The respective dressers for each day are required to be in attendance from 9 o'clock till the conclusion of the practice; and they will be under the direction of the Dental Surgeons of the day, and of the House Surgeon.

Clinical Lectures and Demonstrations.

Each medical officer will give clinical lectures, when opportune, during the ensuing year. Clinical lectures will also be given from time to time on cases of special interest; and also demonstrations upon the preparing and filling of cavities and other operations upon the teeth and contiguous parts.

The Hon. Visiting Physician and Surgeon give Demonstrations weekly, on cases of Oral Surgery, Anæsthetics, Cardiac, and Pulmonary lesions, and a member of the anæsthetic staff gives a course of lectures.

Attendance and Examination of Students.

A register is kept of the attendance of students at the Hospital Practice and lectures. An attendance of full two years at Hospital practice is required by the College of Surgeons of England; and no schedule will be signed for any lectures of which less than two-thirds have been attended. Class examinations are held frequently during the several courses, to test the progress and attention of the pupils; and at the end of each course of lectures a written examination is held, in accordance with the requirements of the College of Surgeons. An insufficient attendance at lectures disqualifies the student for receiving any prize of that year.

Tutorial classes are held to prepare for the final examinations, students who have, at this school, complied with the Dental portion of the Curriculum.

LECTURES.

WINTER SESSION, COMMENCING ON MONDAY, OCT. 1st, 1895.

Dental Anatomy and Physiology, by J. W. Pare, M.D. Edin., L.D.S.E. On Tuesdays and Thursdays, at 5 p.m., during October, November, and December.

Operative Dental Surgery, by George Cunningham, M.A., D.M.D., L.D.S. Eng. On Mondays, at 6 p.m., during October, November and December, (Free to Students of the Hospital and College.)

Dental Materia Medica and Therapeutics, by Charles W. Glassington, M.R.C.S., L.D.S. Edin. On Tuesdays, at 7.30 p.m. during October, November and December. (Free to Students of the College.)

Dental Metallurgy, by W. Lapraik, Ph. D., F.I.C., F.C.S. On Tuesdays, at 7.30 p.m., during January, February, and March.

Dental Mechanics, by Harry Rose, L.D.S. Eng. On Mondays at 7 p.m., during January, February and March.

SUMMER SESSION, 1896.

Dental Surgery and Pathology. On Mondays and Thursdays, at 6 p.m., during May, June, and July.

Elements of Histology, by James Maughan, M.D., L.R.C.P., M.R.C.S. On Mondays and Thursdays, at 5 p.m., during May, June, and July. (Free to students of the College.)

FEES.

GENERAL FEE FOR SPECIAL LECTURES REQUIRED BY THE CURRICULUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND: £15 15s.

Fees to single Courses.		One Course.		Two Courses.
Dental Anatomy and Physiology ...	...	£2 12 6	...	£4 4 0
Dental Surgery and Pathology ...	...	2 12 6	...	4 4 0
Dental Mechanics ...	...	2 12 6	...	4 4 0
Dental Metallurgy ...	...	3 3 0	...	5 5 0
*Operative Dental Surgery ...	...	2 12 6		
*Dental Materia Medica ...	...	2 2 0		
*Elements of Histology ...	...	1 1 0		
*Demonstrations on Dental Mechanics ...	...	1 1 0		

Total Fee for the Special Lectures and Hospital Practice required by the Curriculum, £31 10s.

Fee for the two years' Hospital Practice required by the Curriculum, £15 15s.

* * This scale of Fees only holds good until Oct. 1st, 1896, when they will be raised to 40 and 20 guineas respectively.

PRIZES.

An Entrance Exhibition of the value of £15 is open for competition at the commencement of each Summer and Winter Session, after an Examination in the following Subjects:—

Physiology. (The Functions of Respiration, Circulation and Digestion.)

Examiner—JAMES MAUGHAN, M.D.

Osteology. (Bones of the head.) Examiner—E. W. ROUGHTON, F.R.C.S.

Chemistry. Examiner—WM. LAPRAIK, Ph.D., F.I.C., F.C.S.

Dental Mechanics. (Theoretical and Practical). Examiners—HARRY ROSE, L.D.S. Eng., W. R. HUMBY, L.D.S., Eng.

Six Prizes in Medals, are open for competition among the students of the Colleges, at the end of each Course of Lectures, on the following subjects, viz.. Dental Anatomy, Dental Surgery, Dental Mechanics, Metallurgy, Operative Dental Surgery, and Dental Materia Medica.

Certificates of Honour will be awarded to those Students who show superior proficiency in any of the classes.

* These Lectures are free to Students who have fully entered for the Special Lectures.

The Rymer Gold Medal for General Proficiency, value £5, will be awarded annually to the most distinguished Student of the year. His general conduct and attendance must have been in every respect satisfactory. At the time of the special examination for the Rymer Medal, the Student must not hold any qualification. The Medal will be awarded on the understanding that the Student completes the Dental Curriculum.

The Ash Prize, value £3 3s. in cash for the best Thesis on a subject in Dental Surgery.

The Dean attends the Hospital on Tuesday mornings at 11 a.m.

The public Distribution of Prizes will take place during the Winter Session.

SIDNEY SPOKES, M.R.C.S., L.D.S. Eng., *Dean*.

GUYS' HOSPITAL DENTAL SCHOOL.

THE STAFF OF THE DENTAL SCHOOL.

Dental Surgeons.

F. NEWLAND-PEDLEY, F.R.C.S., L.D.S. Eng.,
W. A. MAGGS, L.R.C.P., M.R.C.S., L.D.S. Eng.
J. H. BADCOCK, L.R.C.P., M.R.C.S., L.D.S. Eng.

Assistant Dental Surgeons.

R. WYNNE ROUW, L.R.C.P., M.R.C.S., L.D.S.E.	J. O. BUTCHER, L.D.S.E.
H. L. PILLIN, L.D.S.E.	M. F. HOPSON, L.D.S.E.
G. O. RICHARDS, M.R.C.S., L.D.S.E.	H. STONER, L.R.C.P., M.R.C.S., L.D.S.E.
A. E. BAKER, L.R.C.P., M.R.C.S., L.D.S.E.	

Anæsthetists.

J. F. W. SILK, M.D.	W. J. SCOTT, M.B., B.S.
F. W. COCK, M.D., M.S.	C. J. OGLE, M.R.C.S.
H. F. LANCASTER, M.D.	E. T. E. HAMILTON, M.D.

FEES.

Admission to the SPECIAL Lectures and Demonstrations, and Dental Practice only, required for the L.D.S. Eng.—£50.

Admission to the GENERAL Lectures, Demonstrations, and Hospital Practice, required for the L.D.S. Eng., £60. A reduction of 12 guineas is made in the case of a student who produces, *on joining the school*, recognized certificates of instruction in Chemistry, Practical Chemistry, and Materia Medica.

Admission to the GENERAL and SPECIAL Lectures and Demonstrations and to the Hospital and Dental Practice required for the L.D.S. Eng. £110 on entrance, or of 60 guineas at the beginning of First Year, and 50 guineas at the beginning of Second Year. From these fees the reduction above mentioned is made.

Arrangements are not made for short periods of instruction.

THE VICTORIA DENTAL HOSPITAL OF MANCHESTER, DEVONSHIRE STREET, ALL SAINTS.

Consulting Physicians :

HENRY SIMPSON, M.D., M.R.C.S. | D. J. LEECH, M.D., F.R.C.P.

Consulting Surgeons :

E. LUND, F.R.C.S. | T. JONES, F.R.C.S.
F. A. HEATH, M.R.C.S. | J. HARDIE, F.R.C.S.

Consulting Dental Surgeons.

H. CAMPION, M.R.C.S. | G. W. SMITH, M.R.C.S.

Dental Surgeons.

Monday Morning I. RENSCHAW, L.D.S.I. ; D. HEADRIDGE, L.D.S. Eng.
Monday Evening W. HEADRIDGE, L.D.S.I. ; L. DRESCHFELD, L.D.S.I.
Tuesday Morning T. TANNER, L.D.S. Eng. ; G. O. WHITTAKER, L.D.S. Eng.
Wednesday Morning P. A. LINNELL, L.D.S. Eng. ; F. W. MINSHALL, L.D.S.I.
Wednesday Evening W. A. HOOTON, L.D.S. Eng. ; C. R. MORLEY, L.D.S. Eng.
Thursday Morning ... H. T. DRESCHFELD, L.D.S. ; E. P. COLLETT, L.D.S. Eng.
Friday Morning ... G. G. CAMPION, L.D.S. Eng. ; W. SIMMS, L.D.S.I.
Friday Evening ... W. DYKES, L.D.S. Glas. ; C. H. SMALE, L.D.S. Eng.
Saturday Morning J. W. DUNKERLEY, L.D.S.I. ; W. SMITHARD, L.D.S.I.

Administrator of Anæsthetics.

Monday Morning ALEXANDER WILSON, F.R.C.S.
Wednesday Morning J. PRINCE STALLARD, M.B.
Saturday Morning ALEXANDER WILSON, F.R.C.S.

Demonstrator.

T. E. SHERRATT, L.D.S. Eng.

House Dental Surgeon.

H. G. ASHEY, L.D.S. Eng.

Preliminary Instruction.

During the first six months at the Hospital, new students are taken by the Demonstrator through a very complete course of practical instruction in all branches of operative dentistry. This course includes the actual preparation and filling of cavities out of, and in the mouth, the treatment of the different pathological conditions of the dental pulp, the treatment and filling of root canals, and the different methods of crowning.

A special course of demonstrations is given to more advanced students by the Lecturer on Operative Dentistry, and other demonstrations are given periodically by the dental staff.

Prizes.—The Fletcher prizes are awarded annually—in July. They consist of a first prize, value £8, for second year's men, and a second prize, value £2, for first year's men. The Matheson Operating Prize, value £3 3s. A prize, value £2 2s. is given by Messrs. Ash & Sons for the best essay on some subject in general surgery in connection with the teeth. This prize is awarded in July. Two prizes, value one guinea and two guineas are offered respectively to first and second year's men, for proficiency in the

extraction of teeth. A prize, value 2 guineas, for the best Regulating Case treated during the year.

FEES.—The Fee for the 2 years' Dental Hospital Practice required by the College of Surgeons of England is £12 12s., which must be paid in advance.

A prospectus containing full information may be had on application to—

GEORGE G. CAMPION, Dean.

THE OWENS COLLEGE, MANCHESTER.

Principal—A. W. WARD, LITT., D., LL.D.

Dean of the Department of Medicine—Professor ALFRED H. YOUNG, M.B.,
F.R.C.S.

DENTAL DEPARTMENT.

PROFESSORS AND LECTURERS.

- Anatomy, Descriptive and Practical*—Professor ALFRED H. YOUNG, M.B., F.R.C.S.
Physiology—Brackenbury Professor WM. STIRLING, M.D., D.Sc.
Chemistry—Professor HAROLD B. DIXON, M.A., F.R.S.
Organic Chemistry—Professor W. H. PERKIN, Ph. D., F.R.S.
Materia Medica and Therapeutics—Professor D. J. LEECH, M.D., F.R.C.P.
Medicine—Professor J. DRESCHFELD, M.D., F.R.C.P.
Surgery—Professor THOMAS JONES, M.B., F.R.C.S.
Clinical Surgery—Professor WALTER WHITEHEAD, F.R.C.S.E., F.R.S.E.
Dental Surgery—Lecturer, G. G. CAMPION, L.D.S.
Operative Dentistry—Lecturer, G. O. WHITTAKER, L.D.S.
Dental Anatomy and Physiology—Lecturer, W. A. HOOTEN, L.D.S., L.R.C.P.,
M.R.C.S.
Dental Mechanics—Lecturer, THOMAS TANNER, L.D.S.
Dental Metallurgy—Lecturer, C. A. BURGHARDT, Ph. D.
Dental Pathology and Histology—Demonstrator, DAVID HEADRIDGE, L.D.S.

The Dental Department forms an integral part of the Department of Medicine, and with the Manchester Royal Infirmary and the Victoria Dental Hospital affords the fullest opportunities for study to students preparing for any of the Dental Examinations.

In addition to the ordinary Dental Lectures required by the Licensing Bodies, a course on Operative Dentistry is given during the Summer Session, and these are supplemented by a series of Practical Demonstrations given by the Lecturer at the Victoria Dental Hospital.

There is also a special Course of Demonstrations in Dental Histology and Pathology, in which Students are enabled to mount for themselves Microscopic Specimens illustrating these subjects.

PRIZES.—Prizes or Medals and Certificates are awarded in all the classes on the results of the several examinations.

Special Prizes are also awarded at the Victoria Dental Hospital.

The WINTER SESSION commences on October 1st.

Prospectuses will be forwarded on application.

H. W. HOLDER, M.A., Registrar.

LIVERPOOL.

DENTAL HOSPITAL, MOUNT PLEASANT.

Consulting Physician—THOMAS ROBINSON GLYNN, M.D., M.R.C.P., Lond.*Consulting Surgeon*—FRANK T. PAUL, F.R.C.S. Eng.*Consulting Dental Surgeons.*

C. ALDER, L.D.S.

W. H. WAITE, L.D.S., D.D.S.

H. C. QUINBY, L.D.S., D.D.S.

Honorary Dental Surgeons.

R. M. CAPON, L.D.S. Glasgow.

THOS. MANSELL, L.D.S. Edin.

R. H. BATES, L.D.S. Eng.

E. A. MANSELL, L.D.S. Eng.

E. A. COUNCELL, L.D.S. Eng.

J. P. ROBERTS, L.D.S. Ed.

R. EDWARDS, M.R.C.S., L.D.S. Eng.

J. ROYSLION, L.D.S. Eng.

FREDERICK ROSE, L.D.S. Eng.

M. ALEXANDER, L.D.S.I.

W. MAPPLEBECK, L.D.S.I.

C. A. BARSTOW, L.D.S. Eng.

Demonstrator of Operative Dental Surgery.

W. H. GILMOUR, L.D.S. Eng.

Anæsthetist.—J. G. GEMMELL, M.B., C.M.*House Surgeon.*

J. A. WOODS, L.D.S. Eng.

Dean—R. EDWARDS, M.R.C.S., L.D.S. Eng.

This Hospital is a school of Practical Dental Surgery, duly recognised by the Royal College of Surgeons, and open to all Students of Dentistry, under such regulations as shall be determined by the Committee of Management.

The Hospital is open, daily, for the admission of patients from 9 till 11 a.m., and from 6. 30 to 8 p.m., except on Saturday.

Fees for Hospital Practice. £12 12s. for two years' Hospital Practice required for the curriculum. £15 15s. perpetual.

Further information may be obtained by applying to the Dean.

BIRMINGHAM.

MASON COLLEGE, (WITH QUEEN'S FACULTY OF MEDICINE.)

Principal Professor R. S. HEATH, M.A., D.Sc.*Dean of the Queen's Faculty* ... Professor WINDLE, M.A., M.D., D.Sc.*Hon. Sec. Dental Department*—Mr. JOHN HUMPHREYS, L.D.S.I., F.L.S.

DENTAL DEPARTMENT.

*Professors and Lecturers.**Anatomy*—Professor BERTRAM C. A. WINDLE, M.A., M.D., D.Sc.*Physiology*—Professor F. J. ALLEN, M.A., M.D.*Chemistry*—Professor PERCY F. FRANKLAND, Ph.D., B.Sc., F.R.S.*Medicine* } Professor C. W. SUCKLING, M.D., M.R.C.P.

} Professor R. SAUNDBY, M.D., F.R.C.P.

Surgery { Professor BENNETT MAY, B.S., F.R.C.S.
 { Professor G. BARLING, B.S., F.R.C.S.

Materia Medica—JOHN BARCLAY, B.Sc.

Dental Surgery—F. HUXLEY, M.R.C.S., L.D.S.

Dental Anatomy—J. HUMPHREYS, L.D.S.I., F.L.S.

Dental Mechanics—F. H. GOFFE, L.D.S.

Dental Metallurgy { Professor FRANKLAND.
 { W. G. MACMILLAN, F.I.C.

Surgical Diseases of the Mouth—F. MARSH, F.R.C.S.

Medical Diseases of the Mouth—STACEY WILSON, M.D., M.R.C.P.

Demonstrators.

Operative Dental Surgery—W. T. MADIN, L.D.S.

Mechanical Dentistry—F. R. HOWARD, L.D.S.

Dental Pathology—J. D. WHITTLES, L.D.S.

Special Courses

Of Lectures for Dental Students will be delivered on—

i. Syphilis and Surgical Diseases of the Mouth in their relation to Dentistry, by Frank Marsh, F.R.C.S., Surgeon to the Queen's Hospital.

ii. Diseases of the Mouth and of Digestion in their relation to Dentistry, by T. Stacey Wilson, M.D., M.R.C.P., Physician to the General Hospital.

The Department, in conjunction with the Dental, the General, and the Queen's Hospitals, provides the entire course of instruction required for the Diplomas in Dental Surgery of the Royal Colleges of Surgeons.

The College possesses a well equipped Dental Museum and Laboratory. An Entrance Scholarship, Medals, and Certificates in the classes are offered annually. At the Dental Hospital, particular stress is laid upon the teaching of all latest methods of conservative Dentistry, including the various modes of Gold Filling, and Crown and Bridge work.

For prospectuses, and further information, application should be made to JOHN HUMPHREYS, Esq., L.D.S.I., F.L.S. Hon. Sec., to the Department, 149, Edmund Street, or to

GEO. H. MORLEY, REGISTRAR.

BIRMINGHAM DENTAL HOSPITAL,

71, NEWHALL STREET.

OPEN DAILY AT NINE A.M.

Hon. Consulting Physician—ROBERT M. SIMON, M.D.

Hon. Consulting Surgeon—JOHN ST. S. WILDERS, M.R.C.S.

Hon. Consulting Dentists :

ADAMS PARKER, L.D.S.

CHARLES SIMS, L.D.S.

Hon. Administrators of Anæsthetics:

S. W. HAYNES, M.B.

CYRIL HUTCHINSON, M.R.C.S.

J. HENRY BLAKENEY, M.R.C.S.

T. SYDNEY SHORT, M.B.

CHAS. ST. JOHNSTON, M.R.C.S., L.R.C.P.

A. T. POOLER, M.R.C.S.

Hon. Dental Surgeons:

H. BREWARD NEALE, L.D.S.	J. HUMPHREYS, L.D.S.
F. E. HUXLEY, M.R.C.S., L.D.S.	F. W. RICHARDS, L.D.S.
F. H. GOFFE, L.D.S.	A. E. DONAGAN, B.A., L.D.S.

Hon. Assistant Dental Surgeons:

W. R. ROBERTS, L.D.S.	W. T. MADIN, L.D.S.
F. R. HOWARD, L.D.S.	J. MOUNTFORD, L.D.S.
J. E. PARROTT, L.D.S.	P. T. NADEN, L.D.S.

House Surgeon:

A. STEYNOR, L.D.S.

Demonstrators:

A. T. HILDER, L.D.S., & W. M. KNOTT, L.D.S.

DEMONSTRATIONS.

Clinical Demonstrations will be given from time to time by the Staff on cases of particular interest; also daily upon the preparing and filling of cavities, the insertion of porcelain inlays, pivoting teeth, adapting porcelain and metal crowns to broken down teeth.

The Demonstrators attend four days a week to instruct the Students. New Students are taken through a complete course for three months in the first principles of operative dentistry.

Dental Students are required to register their names for Hospital Practice with the Honorary Surgical Secretary, Mr. F. W. Richards, 27, Paradise Street, from whom further information may be obtained.

DEVON AND EXETER DENTAL HOSPITAL, EXETER.

President.

RICHARD LEY, Esq., J.P.

Honorary Treasurer.

J. M. ACKLAND, M.R.C.S., L.D.S. Eng.

Consulting Surgeons.

A. J. CUMMING, F.R.C.S. Eng.
JAMES BANKART, M.B.Lond., F.R.C.S. Eng.

Consulting Dental Surgeon.

S. BEVAN FOX, L.D.S. Eng.

Dental Surgeons.

T. BROWNE-MASON, L.D.S. Eng.	J. M. ACKLAND, M.R.C.S., L.D.S.
HENRY BIGING MASON, L.D.S. Eng.	Eng.
T. G. T. GARLAND, L.D.S.I.	J. A. MALLET, L.D.S. Eng.
T. A. GOARD, L.R.C.P. Lond.,	L.D.S. Eng.

Surgeon Administrators of Anæsthetics.

JOHN MORTIMER, M.B. Lond., M.R.C.S. Eng.
RUSSELL COOMBE, M.A. Cantab., F.R.C.S. Eng.

Honorary Secretary.

HENRY YEO.

Attendance on the practice of this Hospital is recognised by the Royal College of Surgeons of England as qualifying for their Dental Diploma.

The Hospital is open daily (Sundays excepted), and patients are admitted between the hours of 9 and 11 a.m.

Pupils or any member of the Staff or other registered Practitioner (being a Life or Annual Governor) are permitted to attend the Practice of the Hospital, subject to the approval of the Medical Sub-Committee, on payment of Five Guineas annually to the Funds of the Institution. Students attending the practice of the Hospital must consider themselves strictly under the control of the Medical Officers, and must not undertake any operation without the consent of the Dental Surgeon for the day.

PLYMOUTH DENTAL HOSPITAL, BANK STREET CHAMBERS, BANK STREET, PLYMOUTH.

The Dentists attend each day, at 9 a.m. except Sundays.

Certificates of attendance on the practice of this Dental Hospital are recognized by the College of Surgeons as qualifying for the Diploma in Dental Surgery. The College also recognizes the lectures delivered at the Hospital.

Pupils of any of the Dental Surgeons of the Plymouth Dental Hospital, or other Dentists holding a Diploma of the College of Surgeons, or Members of the Odontological Society, may attend the Hospital on the day of such practitioner as may agree to accept such pupils, on the payment of £1 1s. per annum to the institution.

A Course of Lectures will—if a sufficient number of Students present themselves—be delivered during the year.

On "Dental Physiology, Dental Anatomy, Dental Mechanics."

Fee to Lectures, one Course, £7 7s.

Fee to Lectures, double Course, £12 12s. (required for Diploma.)

Fee to Dental Practice at Hospital £5 5s. per annum.

Fee to entire Dental Curriculum (required for Diploma) 22 guineas.

E. A. BENNETT, Hon. Sec. and Treasurer.

EDINBURGH. INCORPORATED EDINBURGH DENTAL HOSPITAL AND SCHOOLS.

Consulting Physician—ALEX. PEDDIE, M.D., F.R.C.P.E.

Consulting Surgeon—JOSEPH BELL, M.D., F.R.C.S.E.

Consulting Dental Surgeon—JOHN SMITH, M.D., F.R.C.S.E.

Dean—W. BOWMAN MACLEOD, L.D.S.

Dental Surgeons.

JOHN S. AMOORE, L.D.S. Edin.

MALCOLM MACGREGOR, L.D.S. Edin.

GEORGE WATSON, L.D.S. Edin.

J. STEWART DURWARD, L.D.S. Ed.

JAMES MACKINTOSH.

WILLIAM FORRESTER.

Assistant Dental Surgeons.

J. GRAHAM MUNRO, L.D.S. Edin.	DAVID MUNRO, L.D.S. Edin.
FRED PAGE, L.D.S.	THOMAS GREGORY, L.D.S.
JOHN TURNER, L.D.S. Edin.	H. B. EZARD, L.D.S. Edin.

Extra Assistant Dental Surgeons.

R. NASMYTH HANNAH, L.D.S.	J. BAILLIE WILSON, L.D.S.
SEWILL SIMMONS, L.D.S.	

Chloroformists.

W. BASIL ORR, M.D.	MATHESON CULLEN, M.B., C.M.
W. LUNDIE, M.B., C.M.	J. M. FARQUHARSON, M.B., C.M.

Tutorial Dental Surgeon.

D. R. CAMPBELL, L.D.S.

DENTAL SCHOOL.

LECTURES.

Dental Anatomy and Physiology (Human and Comparative) by ANDREW WILSON, L.D.S.—These Lectures will be delivered on the evenings of Tuesday and Friday, at 8 o'clock, commencing October, 1896. The Course consisting of twenty-four Lectures, will be illustrated by preparations, models, diagrams, microscopical specimens, etc.

Dental Surgery and Pathology, by GEORGE W. WATSON, L.D.S.—These Lectures will be delivered on the mornings of Tuesday and Friday at 8 o'clock, during the Summer Session, commencing May, 1895. The course, consisting of twenty-four Lectures, will be illustrated by preparations, models, diagrams, microscopical preparations, etc.

Mechanical Dentistry, by W. BOWMAN MACLEOD, L.D.S. The Lectures will commence November, 1895, at 8 p.m., and be continued every Wednesday thereafter till the Course of at least twelve Lectures is concluded.

In connection with the above a course of Lectures on Metallurgy will be given by FORBES WATSON, B.Sc., F.G.S.

Practical Mechanics.—J. GRAHAM MUNROE, L.D.S.—In addition to the Systematic Lectures, there will be given during the Session, Demonstrations on Dental Mechanics, and each Student will be expected to prepare the mouth, take the impression, make the denture, and insert the same in at least four cases. Special facilities are afforded in the Mechanical Department; a large and fully equipped workroom under the charge and direction of a competent mechanic, having been set aside for the construction of dental appliances. The Demonstrations will be spread over the two years of Hospital practice, and will be given as occasion serves. Students will be required to furnish their own hand tools.

Extra course of Lectures, Dental Materia Medica and Therapeutics, by WM. GUY, F.R.C.S., L.R.C.P., L.D.S. Gold Fillings, H. BYCROFT EZARD, L.D.S.

In the various classes prizes will be offered for competition.

General Fee for the Hospital Practice and special Lectures required by the Curriculum.—Hospital Practice, £15 15s. One Course each of Dental Anatomy, Dental Surgery, and Mechanical Dentistry, £9 15s.—£25 10s.

Fees to separate Classes.—Dental Anatomy, Dental Surgery, Mechanical Dentistry, £3 5s. each.

The Hospital Practice and Lectures qualify for the Dental Diploma of the Royal College of Surgeons, Edinburgh, and also for the other Licensing Bodies. Second Courses of the Lectures as required by the Royal College of Surgeons of England, £2 4s.

For further information apply to the Dean, who will be found at the Hospital every Thursday morning between 9 and 10 o'clock.

THE SESSION 1895-6 OPENS OCTOBER 2nd, 1895.

General Fee for the Hospital Practice and special Lectures required by the Curriculum.

Hospital Practice, Two Years.....	£15	15	0
One Course of 24 Lectures in Dental Anatomy ...	}	9	15
„ 22 „ „ Surgery ...			
„ 12 „ „ Mechanics ...			
Total.....	£25	10	0

For further particulars, apply to the Dean, Chambers Street, Edinburgh.

GLASGOW.

DENTAL HOSPITAL AND SCHOOL,

4, CHATHAM PLACE, STIRLING ROAD.

The Hospital is open daily except Saturday and Sunday, from 5 p.m. till 7 p.m.

The work of the Hospital is conducted as far as possible, by the Students, under the supervision of the Dental Officer of the day. Cases of special interest will be made the subject of clinical instruction or demonstration as they occur.

The practice of the Hospital may be entered upon at any time during the Session and attendance dated therefrom. Fee for the two years' practice required by the Curriculum, £15 15s. Fee for each course of Lectures, £3 3s.

DENTAL SCHOOL.

Dental Anatomy and Physiology, Human and Comparative, by W. WALLACE, M.A., M.B., L.D.S.

The Lectures will be delivered in the Summer Session, on the evenings of Tuesdays and Fridays, at 7 p.m., and will be illustrated by Diagrams, Preparations, and Microscopic Specimens. Text Book—Tomes, Manual of Dental Anatomy, Human and Comparative.

Dental Surgery and Pathology, by REES PRICE, L.D.S. Eng., M.R.C.S.

These Lectures are delivered on Tuesdays and Thursdays during the months of May and June, at 8 a.m., and will be illustrated by recent Specimens, and other Preparations and Drawings, &c. Text-books—Tomes, Manual of Dental Surgery; Salter's Dental Pathology and Surgery.

Mechanical Dentistry, by J. A. BIGGS, L.D.S.

This course will commence on the first Tuesday of November at 7 p.m., and will consist of 12 Lectures, with Practical Demonstrations in Dental Laboratory.

All communications on matters relating to the Dental School should be addressed to D. M. ALEXANDER, Solicitor, 97, West Regent Street, Glasgow, who will forward detailed Prospectus of the School.

SCHOOL OF MEDICINE, EDINBURGH.

The Fees required for students attending general subjects necessary for the curriculum of the Royal College of Surgeons, Edinburgh, are the same as those for the Conjoint Examining Board, as Candidates for the L.R.C.S.E. require to be in possession of a recognised Diploma in Medicine.

The Secretary of the School is Mr. R. N. RAMSAY, 24, Forest Road, Edinburgh, from whom the official Calendar may be had gratis.

DENTAL HOSPITAL OF IRELAND,

LINCOLN PLACE, DUBLIN.

The WINTER SESSION will commence on Monday, October 14th, 1895.

The SUMMER SESSION will commence in May, 1896.

Consulting Physicians:

F. R. CRUISE, M.D.

JOHN W. MOORE, M.D.

Consulting Surgeons:

E. H. BENNETT, F.R.C.S.I.

SIR W. STOKES, F.R.C.S.I.

Consulting Dental Surgeons:

R. H. MOORE, F.R.C.S.I.

DANIEL CORBETT, M.R.C.S.E.,

W. BOOTH PEARSALL, F.R.C.S.I.

L.D.S. Eng.

Dental Surgeons:

ROBERT HAZELTON, F.R.C.S.I.

A. W. W. BAKER, M.D., F.R.C.S.I.,

R. THEODORE STACK, M.D.

L.D.S.I.

F.R.C.S.I., D.M.D. (Harv.) L.D.S.,
Eng.

G. W. YEATES, M.B., Ch M., L.D.S.I.

G. M. P. MURRAY, F.R.C.S.I.

D. CORBETT, Jr., A.B., F.R.C.S.I.

J. S. THOMPSON, L.D.S. Ed.

Assistant Dental Surgeons.

SHENSTONE BISHOP, L.D.S.I.

K. E. O'DUFFY, L.D.S., Ed.

VINCENT DOYLE, L.D.S.I.

GEORGE P. MOORE, M.B., Ch.M.,
L.D.S.E.*Anæsthetists.*

J.G. CRONYN, L.R.C.S.I., K.L.Q.C.P.I. | W.R. GRAVES, L.R.C.S.I., L.K.Q.C.P.I.

JAMES B. COLEMAN, M.B., Ch.M., R.U.I.

Pathologist—WILLIAM MALLET PURSER, M.D.*Registrar*—WILLIAM A. SHEA

In connection with the Dental Hospital of Ireland, the Dental School will be open for the Winter Session on October 14th, 1895.

All Dental Students who have passed their Preliminary Examination are admissible to the Clinical Instruction of the Hospital, after paying Fees and subscribing to the conditions prescribed by the Staff.

In addition to Clinical Instruction, Courses of Lectures and Demonstrations will be given at the Hospital in Dental Surgery and Pathology, Mechanical Dentistry, the Administration of Anæsthetics, crowns, pivots, porcelain inlays, gold fillings, regulating plates, &c.

The Lectures on Dental Surgery and Mechanical Dentistry will be given during the winter, those in Dental Anatomy and Metallurgy during the summer months.

In addition to the longer courses of Hospital attendance, special courses of three months' duration, will be given to Surgeons about to join the Army and Navy, or to practise in the Colonies or remote country districts.

Regulations as to Fees and other conditions can be obtained from the Registrar of the Hospital, or from

R. THEODORE STACK, Dean.

COOKE'S SCHOOL.

This School is recognised by the London University, the Apothecaries' Hall, and other Examining Bodies, and offers somewhat special advantages to such as aim at combining the Dental and Medical Curricula with economy as to time and expense. Through the School being open for Anatomical work, not only during the winter months, but also during the summer months, extra time is obtained which would admit of the Dental and Medical Curricula being taken conjointly in something like the time usually allotted to either. The Licence of the Apothecaries' Hall admits to the Examination for the L.D.S. of Edinburgh and Dublin. Passing the Examination in Anatomy and Physiology at the Apothecaries' Hall further admits in the direction of purely Medical Examinations, to the final Examination for the Triple Qualification of Edinburgh and Glasgow, (Licence of the Royal Colleges of Physicians and Surgeons of Edinburgh, and Licence of the Faculty of Physicians and Surgeons of Glasgow). It is not intended to take on at Cooke's School more than a limited number of men, *who must be steady and earnest workers*. For such, however, exceptional advantages are offered in regard to thoroughly practical work in Anatomy and Physiology. The School also affords ample opportunities for additional work in preparation for the various examinations: dissecting room well supplied with dissected parts, &c., &c. For further information apply to Mr. Thomas Cooke, F.R.C.S., 40, Brunswick Sq., W.C.

INSTITUTE OF DENTAL TECHNOLOGY, AND SCHOOL OF MECHANICAL DENTISTRY,

4, LANGHAM CHAMBERS, ALL SOUL'S PLACE, LONDON, W.

The *first* year's course is mainly devoted to Manual Training in Wood and Metal Work at Anvil, Forge, Vice, and Lathe, with Drawing; Instrument Making; Modelling and Wood-carving with Repoussé Work; Pattern-making and Moulding; and the Scientific Course in Physics, Chemistry, and Morphology of the Teeth; the *second*, to Applied Manual Training in a graduated series of dental appliances, Plate Work, Crown and Bridge Work; and the Applied Science Course of Chemical and Metallurgical Dental Technics, Furnaces, Metals, Alloys, Solders, Plate, Wire, Clasps, Amalgams, and Cements; the *third*, to special and more advanced work in Mechanical Dentistry, comparative value of different methods, Keramics, Continuous Gum Work, Obturators, Dental Splints, and Surgical Appliances and Restorations; and to Research Work or Elective Studies according to individual capacity.

The Manual Training Department is in full working order under the superintendence of W. H. MASSEY (City and Guilds Certificate).

The Scientific Department will be ready in October, under the direction of W. LAPRAIK, Ph.D., F.I.C., F.C.S.

The Art Teaching will be conducted by special instructors from the Guild and School of Handicraft, by arrangement with C. A. ASHBEE, M.A.

The Sedley Taylor (£25) and the Jonas £10 Scholarships will be awarded according to the applicant's skill and experience in handicraft, previous to entrance as a Student.

Probationary Course in Manual Training, three months, 38 hours teaching weekly; pupils can enter at any time. Fee, £21, which will be accepted as part premium; and the course as part time of any subsequent indenture.

A Special Practical Tuition Class will commence early in October, for the practical examination in Mechanical Dentistry for the L.D.S.

Further particulars and full syllabus may be obtained from the Principal,—
GEORGE CUNNINGHAM, M.A. Cantab., D.M.D. Harvard Univ.,
L.D.S., R.C.S. Eng.

IV. GENERAL HOSPITALS.

CHARING CROSS HOSPITAL.

Dental Surgeon—J. F. COLYER, M.R.C.S., L.R.C.P., L.D.S., who attends at the Hospital, two days a week, at 9 a.m. for Dental Operations. A course of Lectures on Dental Surgery is also given during January, February, and March, and Tutorial classes three days each week throughout the year by Mr. COLYER.

Students may serve as assistants to the Dental Surgeon for a period of three months.

The composition fee for dental students is 54 guineas, or 60 guineas, payable in two instalments of 30 guineas each.

A proportionate reduction of the above fees will be made to those students who have completed part of the curriculum at a recognized institution.

The hours of lectures have been specially arranged to suit the convenience of dental students. Charing-cross Hospital is within three minutes' walk of the Dental Hospital of London.

For further information apply to the Dean, Mr. Stanley Boyd, or to the Librarian and Secretary, Mr. J. Francis Pink, at the office of the Medical School, Chandos Street, Charing-cross, between the hours of 10 and 4.

LONDON HOSPITAL AND MEDICAL COLLEGE.

Dental Surgeon—ASHLEY BARRETT, M.B. Lond. M.R.C.S., L.D.S.

The Council of the College of Surgeons recognize the Dental Department of the London Hospital as a school at which may be obtained the Dental Practice necessary to qualify a student for the Examination of the Dental Diploma. Dental Students may obtain the General Medical Education (that is, apart from certain special Lectures to be attended at a Dental School) and the Dental Practice necessary for the Diploma, at the London Hospital School, on payment of Forty Guineas,

A course of Lectures on the Anatomy and Pathology of the Teeth and Dental Surgery will be delivered by Mr. Ashley Barrett, on days which will be duly announced. It comprises the treatment of dental irregularities, of Dental Caries and such matters in connection with the subject as are of interest to the Medical Practitioner. Mr. Barrett gives practical instruction on Tuesdays at 9 a.m., which is open to all students of the School and can be attended by gentlemen who are not pupils on payment of a fee of Ten Guineas.

In addition to the Lectures a series of Demonstrations of the simpler modes of filling teeth will be given during the month of June. The Demonstrations will refer to the modes of Manipulating Amalgam and Gutta Percha fillings, the preparation of Cavities, the filling of Teeth containing vital and dead

pulps, the mode of relieving pain after filling, and the instruments needed for these operations.

A Dental Assistant is elected every three months, without any additional expense. The terms of the office date from the first Tuesday in January, April, July and October. In selecting Candidates, priority will be given to those who have attended the greatest number of Lectures on Dental Pathology and Surgery, and have also been the most punctual in attendance in the Dental Department on Tuesday morning.

Further information may be obtained on application to Mr. Munro Scott, the Warden, Medical College, London Hospital.

KING'S COLLEGE, STRAND, W.C.

Special arrangements are made for Dental Students. Apply to the Dean.

MIDDLESEX HOSPITAL.

Consulting Dental Surgeon—J. S. TURNER, M.R.C.S., L.D.S.

Dental Surgeon—W. STORER BENNETT, F.R.C.S., L.R.C.P., L.D.S.

Assistant Dental Surgeon—W. HERN, M.R.C.S., L.D.S.

Students who intend to become Licentiates in Dental Surgery of the Royal College of Surgeons are admitted to attend the requisite courses of Lectures—which are arranged to fit in with the work at the Dental Hospitals—and Hospital Practice on payment of a fee of 54 guineas, in one payment, or by instalments of £42 on entrance, and £21 at the beginning of the Second Winter Session.

A short course of Lectures on Dental Surgery will be delivered during November and December by the Lecturer on Dental Surgery, Mr. Storer Bennett. The Lectures will be supplemented by practical Demonstrations, which will be given every week during the Winter and Summer Sessions by the Dental Surgeon and Assistant Dental Surgeon. Students of the Hospital free, others pay a fee of 2 guineas.

Further information may be obtained from Sidney Coupland, M.D., the Dean, or from the Resident Medical Officer at the Hospital.

ST. BARTHOLOMEW'S HOSPITAL AND COLLEGE.

Dental Surgeons—MR. PATERSON, MR. ACKERY.

Assistant Dental Surgeons—MR. READ, MR. ACKLAND.

The Dental Department of the Hospital is open on Tuesday and Friday

mornings at 9 o'clock. The practice of the department is recognised by the Royal College of Surgeons.

The fee for general subjects for Dental Students for the first winter is £33 2s. 6d., for the first summer £33 2s. 6d., or a single payment of £66 3s.

ST. GEORGE'S HOSPITAL.

Dental Surgeon—H. L. ALBERT, M.R.C.S.

Mr. Albert attends at the Hospital on Mondays and Fridays at 12 noon; his assistant on Tuesdays and Saturdays, at 1 p.m.

Fees for general subjects in Dental Surgery, exclusive of Practical Chemistry, £50, or £55, in two instalments: first year, £30; second year, £25.

Further information can be obtained by application to Dr. ISAMBARD OWEN, Dean of the Medical School.

ST. MARY'S HOSPITAL MEDICAL SCHOOL.

Dental Surgeon—MORTON SMALE, M.R.C.S., L.D.S.

Practical instruction in Dental Operations is given on Wednesdays and Saturdays at 9 a.m. Dressers are appointed who hold office for three months.

For prospectuses and further information apply to the School Secretary, Mr. FREDERIC H. MADDEN.

GEORGE P. FIELD, Dean of the School.

ARTHUR P. LUFF, M.D., Sub-Dean.

ST. THOMAS'S HOSPITAL.

Dental Surgeon—CHARLES EDWIN TRUMAN, M.A. Cantab, M.R.C.S.,
L.D.S.

Assistant Dental Surgeon—Vacant.

Gentlemen may receive instruction in diseases of the teeth, are appointed dressers, and can undertake operations, subject to the supervision of the Dental Surgeons, Tuesdays and Fridays at 10 a.m.

Numerous cases of irregularity of the teeth, and the application of artificial appliances, are undertaken during the term.

The fee for attendance on the *general* subjects required of the students in Dental Surgery, is, for the two years, £65, or by instalments, £55 for the first year, and £15 for the second year.

UNIVERSITY COLLEGE HOSPITAL.

Dental Surgeon—SIDNEY SPOKES, M.R.C.S., L.D.S.

Mr. Spokes attends at the Hospital on Tuesdays and Fridays, at 9.30 a.m. and delivers a Course of Lectures on Fridays at 5 p.m., during the months of November and December.

At University College a material reduction in the fees is made for students who are entered at a recognised Dental Hospital. For those who do not require Chemistry and Materia Medica, there is a Composition Fee of 50 guineas.

WESTMINSTER HOSPITAL.

Consulting Dental Surgeon—J. WALKER, M.D., M.R.C.S., L.D.S.

Dental Surgeons—C. W. GLASSINGTON, M.R.C.S., L.D.S., & E. GARDNER, L.D.S.

Dental Department.

The Dental Surgeons, Mr. Glassington and Mr. Gardner, attend at 9.15 a.m. on Wednesdays and Saturdays respectively.

Mr. Glassington attends at 9.15 a.m. on Wednesdays, and Saturdays for practical demonstration of diseases and operations of the teeth.

The fee for attendance on the Dental Practice is £2 2s. for three months, and £3 3s., for six months. The whole of the General Lectures and Surgical Practice required for the Dental Diploma of the College of Surgeons can be attended for 50 guineas in one sum on entrance, or for two sums of £30, and £26 payable at the beginning of each year.

Mr. Glassington will give a series of Demonstrations on Dental Surgery and Pathology, to meet the requirements of the general student of Medicine, at an hour to be determined at the commencement of the Session.

A Scholarship value £20 is offered annually in September for Competition to commencing Dental Students.

Introductory Address.—Dr. Monckton Copeman.

Distribution of Prizes.—Right Hon. Viscount Peel.

Annual Dinner, Cafe Monico, 7 p.m., Dr. de Havilland Hall in chair.

Dinner Secretary.—Dr. W. A. Wills.

HARVARD UNIVERSITY DENTAL DEPARTMENT, BOSTON, MASS., U.S.A.

The Sessions of this School begin the last Thursday in September, and end the last Wednesday in June, making nine months of practically continuous work in each year.

General Anatomy, with Dissections, Physiology, General Chemistry, Histology, and Bacteriology, are the studies of the first year. Of the second year they are Operative and Mechanical Dentistry, *Materia Medica* and Therapeutics, Oral Anatomy and Physiology, and Crown and Bridge work. Of the third year Operative and Mechanical Dentistry, Surgical Pathology, and Orthodontia. The Student can also attend gratuitously all the *lectures* in any other department in the University.

The Infirmary furnishes abundant facilities, averaging 8,000 operations, of which a large proportion consists of filling teeth, every year.

The University degree D.M.D. (*Dentariæ Medicinæ Doctor*) is conferred on all who fulfil the requirements.

For the first year a student is a member of the school the fee is 200 dols.; for the second year, 150 dols., and for any subsequent year, 50 dols.

For further information and announcements, address, Thomas H. Chandler, Dean, 161, Newbury Street, Back Bay, Boston, Mass., U.S.A.

THE DENTAL COLLEGE OF THE UNIVERSITY OF MICHIGAN.

The Annual Session of this Institution will commence on the 1st of October, and close on the last Thursday of June, thus making a course of nine months. A preliminary examination, having reference to general education attainments, is required.

The Student in this department will receive instructions in Anatomy, Physiology, Histology, (didactic and laboratory), Pathology, Bacteriology, (didactic and laboratory), General Chemistry, (didactic and laboratory), Organic Chemistry, *Materia Medica*, Therapeutics, Surgery, and Hygiene, from the professors of their respective branches in the *Departments of Medicine and Surgery* of the University, when lectures commence and continue the same as with the Dental College.

Special instructions will be given in Dental Pathology, Oral Surgery, Dental Therapeutics, and diseases of Women and Children, with reference to the teeth.

FEEES AND EXPENSES.

The fees, which must be paid in advance, are as follows:

RESIDENTS OF MICHIGAN.—Matriculation, 10.00 dols. Annual dues, 30.00 dols.

NON-RESIDENTS.—Matriculation, 25.00 dols. Annual dues, 40.00 dols.

For the various Laboratories, 35.00 dols.

GRADUATION FEE.—For all alike, 10.00 dols. The matriculation fee is paid but once, and entitles the student to the privilege of permanent membership in any department of the University. The Annual due is paid the first year and every year thereafter while at the University.

SCIENTIFIC ASSOCIATIONS.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN, 40, LEICESTER SQUARE, W.C.

OFFICERS FOR 1895-96.

President—DAVID HEPBURN.

Vice-Presidents :

RESIDENT.
ASHLEY GIBBINGS.
JOHN FAIRBANK.
C. J. BOYD WALLIS.

NON-RESIDENT.
W. E. HARDING, (Shrewsbury.)
GEORGE HENRY, (Hastings.)
J. F. COLE, (Ipswich).

Treasurer—S. J. HUTCHINSON.

Librarian—W. A. MAGGS.

Curator—STORER BENNETT.

Editor of the Transactions—E. LLOYD WILLIAMS.

Honorary Secretaries.

J. H. MUMMERY, (Foreign) J. F. COLYER (Council),
CLAYTON WOODHOUSE, (Society),

Councillors.

RESIDENT.
C. E. TRUMAN.
W. R. HUMBY.
W. B. PATERSON.
H. BALDWIN.
J. GARTLEY.
CORNELIUS ROBBINS.
SIDNEY SPOKES.
ALFRED SMITH.
G. D. CURNOCK.

NON-RESIDENT.
G. G. CAMPION (Manchester).
J. MCKNO ACKLAND (Exeter).
J. H. MCCALL (Leicester).
T. ARKOVY (Budapest).
A. W. W. BAKER (Dublin).
F. E. HUXLEY (Birmingham).
GEO. CUNNINGHAM (Cambridge).
C. B. MASON (Scarborough).
J. J. ANDREW (Belfast).

EXTRACT FROM THE BYE-LAWS.

Objects and Constitution of the Society.

The Society is instituted for the encouragement and diffusion of knowledge in Dental Surgery, and for the promotion of intercourse among Members of the Dental Profession.

The Society shall consist of Resident, Non-Resident, Corresponding, and Honorary Members.*

1. The Resident Members shall consist of gentlemen residing or practising wholly or partly in London or within ten miles of the General Post Office, St. Martin's-le-Grand.
2. The Non-Resident Members shall consist of gentlemen wholly practising beyond ten miles from the General Post Office.
3. The Corresponding Members shall consist of distinguished gentlemen residing in the Colonies of Great Britain or in Foreign Countries.

* Candidates for the Resident, Non-Resident, or Corresponding Membership of the Society shall not be eligible unless they practise as Dental Surgeons, or are interested in the progress of Dental Surgery, and are also Licentiates in Dental Surgery, or qualified Practitioners of Medicine or Surgery: or possess such a Diploma or Degree as in the opinion of the Council, will qualify them for the Membership of the Society.

4. The Honorary Members shall consist of distinguished Practitioners of Dental Surgery who have retired from practice, of distinguished Medical Practitioners, and of gentlemen distinguished in any department of Science.

Persons who advertise in the public journals, or by circular, either their profession or their professional attainments or public appointments, or anything relating to their mode of practice or charges, or who expose for public inspection specimens of operative or mechanical Dentistry, or conduct their practice in any way which in the opinion of the Council of this Society, is derogatory to the respectability of the Profession, shall not be considered eligible for nomination as members.

No person being the proprietor of a secret remedy, or holding a patent relating to the requirements of Dental Practice, shall be a member of this Society.

Election and Admission of Resident and Non-Resident Members.

Candidates for Resident Membership shall be recommended by four or more Members, two at least signing from personal knowledge. Candidates for Non-Resident Membership shall be recommended by three members, one at least signing from personal knowledge.

All recommendations for resident or non-resident members shall be submitted to, and approved of, by the Council, before being proposed to the Society for ballot.

Contributions of Members.

Every person elected a Resident Member shall pay Three Guineas as an Admission Fee and an Annual Subscription of Two Guineas, *in advance*.

Every person elected a Non-Resident Member shall pay Two Guineas as an Admission Fee and an Annual Subscription of One Guinea in advance.

The Entrance Fees and First Annual Subscriptions shall be paid on admission, and the subsequent Annual Subscriptions in the month of November in each year; but new members proposed at or after the January Meeting, shall not be required to pay any Subscription for the current Session.

Ordinary Meetings.

The Ordinary Meetings of the Society shall be held on the first Monday in each month, from November to June, both inclusive, at 8 p.m. precisely, except in the month of January, or when an Act of Parliament holiday occurs on that day, the meeting shall be held on the Monday next ensuing.

Each Member may introduce two Visitors at these Meetings on writing the Visitors' names in a book to be kept for that purpose. The same Visitors will not be admitted more than three times during one Session.

Annual General Meeting.

The Annual General Meeting of the Society for the election of the Officers and Councillors, &c., shall be held on the evening of the first Monday in June every year.

Society's Transactions.

The Transactions of the Society, under the designation of "Transactions of the Odontological Society of Great Britain," shall be printed at such times and in such manner as the Council shall direct.

The "Transactions" shall be presented to all Resident and Non-Resident members of the Society who have paid their Annual Subscriptions.

ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND,

31, CHAMBERS STREET, EDINBURGH.

President—Mr. J. STEWART DURWARD, L.D.S.*Vice-Presidents.*

Mr. J. S. AMOORE, L.D.S.

Mr. REES PRICE, L.D.S.

Treasurer—Mr. MALCOLM MACGREGOR, L.D.S.*Council*.—Messrs. CAMPBELL, WATSON, WALKER, DALL.*Secretary*—Mr. HERBERT B. EZARD, L.D.S., 32, Buccleuch Place, Edinburgh.*Ordinary Meetings*.—The Society meets on the second Thursdays of November, December, January, February and March.

EXTRACTS FROM THE CONSTITUTION AND LAWS.

Name and Objects.

The Society shall be named the "Odonto-Chirurgical Society," and shall have for its objects the Promotion and Diffusion of Knowledge in matters connected with Dental Surgery; the furtherance of communications on such subjects by members of the Society; and otherwise to advance the interests of Dental Surgery as a branch of Medicine.

Ordinary and Honorary Members.

The Society shall consist of Ordinary, Honorary, and Corresponding Members.

(A.) Ordinary Members. Gentlemen shall be eligible for Ordinary Membership who hold the Licentiate in Dental Surgery of any of the Licensing Bodies of Great Britain or Ireland, or a Colonial or Foreign qualification recognised by the General Medical Council, entitling them to practise dentistry in Great Britain.

(B.) Honorary Members. Gentlemen (practising or retired) who hold a qualification recognised by the General Medical Council, or Foreign or Colonial Dentists holding a qualification recognised in their own country, who may have distinguished themselves in the practice of, or in connection with Dentistry, and Medical or Scientific men who may have distinguished themselves in connection with Dentistry, shall be eligible as Honorary Members.

(C.) Corresponding Members. Gentlemen resident in the Colonies or Foreign Countries, holding qualifications recognised in their respective countries shall be eligible as Corresponding Members.

The Ordinary Members shall have vested in them the Government of the Society, and all cases not otherwise specified shall be decided by them by a majority of votes by ballot if required.

Obligations of Members.

No member shall be permitted to advertise his profession, his modes of practice, or his charges, either in the public journals or by circular. They shall not be permitted to expose specimens of their work for public inspection, nor to carry on their practice in connection with any other business, nor to hold any patent relating to Dental practice, nor to conduct themselves in any way which the Society may consider derogatory to the Profession, so long as they continue members of the Society. But members who practise in towns other than that in which they reside, shall be allowed to intimate their visits; such intimations being subject to the approval of the Council.

Applications for Membership.

Candidates for admission as Members of the Society shall be recommended by an Ordinary Member, and the recommendation seconded by another.

After being approved by the Council, such recommendation shall be read to the Society at an Ordinary Meeting, and shall lie over to the next, when the Candidate shall be balloted for, when two-thirds of the Members present must be in his favour to secure his election.

Contributions.

Ordinary Members residing within a ten-mile radius of the City shall pay an Entrance Fee of One Guinea, and One Guinea of an Annual Subscription in advance. All other Ordinary Members shall pay an Entrance Fee of One Guinea, and Ten Shillings and Sixpence of an Annual Subscription. All Annual Subscriptions to date from the 1st March preceding the Candidate's admission.

NORTH OF ENGLAND ODONTOLOGICAL SOCIETY, NEWCASTLE-ON-TYNE.

President—R. L. MARKHAM, L.D.S.

Vice-Presidents:

J. A. FOTHERGILL, M.R.C.S., &c. | W. SOMMERVILLE-WOODIWIIS,
L.D.S. Edin.

Hon. Treasurer—W. G. ROUTLEDGE, L.D.S. Edin.

Hon. Secretaries:

J. T. JAMESON, L.D.S. Edin., 4, Ridley Place.

W. D. MOON, L.D.S. Eng., 8, Jesmond Road.

Council:

C. F. SUICLIFFE, L.D.S.I.

J. W. DANIELS, L.D.S. Ed.

S. BROWN.

J. G. RANKER, L.D.S. Eng.

W. J. MASON, L.D.S. Edin.

J. F. KEKWICK, L.D.S.

Extract from Laws.

The Society shall have for its objects the diffusion of knowledge, and the promotion of intercourse among Dentists, and the advancement of the general interests of the Dental Profession.

The Society shall consist of Ordinary and Honorary members:—

The Ordinary Members shall consist of gentlemen who are practising or have practised as dentists, and are registered under the Dentists' Act of 1878.

Obligation of Members.

Members shall not be permitted to advertise in the public journals, or by circulars, either their professional attainments, or public appointments, or anything relating to their modes of practice or charges: or to expose for public inspection specimens of operative or mechanical dentistry, or conduct their practices in any way which in the opinion of the Council is derogatory to the Profession.

Application for Membership.

Candidates for admission as Members shall be recommended by one Member from personal knowledge, and by one Member from general knowledge.

Meetings.

The Ordinary Meetings will be held in Newcastle-on-Tyne, on the second Wednesday of each of the months, from October to March inclusive, at 6 p.m.

Contributions.

Members shall pay an Entrance Fee of five shillings on admission, and an annual subscription of half a guinea in advance.

THE BRITISH DENTAL ASSOCIATION,

(Incorporated June 3rd, 1880.)

40, LEICESTER SQUARE, LONDON.

President—C. S. TOMES, F.R.S., M.A. Oxon., M.R.C.S., L.D.S.*Vice-Presidents.*

SIR EDWIN SAUNDERS, F.R.C.S. | Dr. JOHN SMITH, F.R.C.S., Edin.

J. SMITH TURNER, M.R.C.S., L.D.S. Eng.

President of Representative Board—S. J. HUTCHINSON, M.R.C.S., L.D.S.*Treasurer*—E. G. BETTS, M.R.C.S., L.D.S., Eng.*Honorary Secretary*—W. B. PATERSON, F.R.C.S., L.D.S. Eng.*Extracts from Memorandum of Association and Bye-laws.*

The objects for which the Association is established are the promotion of Dental and the allied Sciences, and the maintenance of the honour and the interests of the Dental Profession by

“The Periodical meetings of the Members of the Association and the Dental profession generally, in different parts of the country.

“The publication of a periodical journal, and by

“The maintenance of the spirit and provisions of the Dentists' Act, by such lawful means as may be necessary, &c., &c.”

Extracts from the Bye-laws.

A person who is registered in the Dentists' Register shall be eligible for election as a member of the Association, provided that he be of good character; that he does not conduct his practice by means of the exhibition of Dental specimens, appliances, or apparatus in an open shop, or in a window, or in a showcase exposed to public inspection; or by means of public advertisements or circulars, describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges.

Any registered practitioner not disqualified by any Bye-law who shall be recommended as eligible by any three Members of the Association (the recommendation of one being from personal knowledge), and who has signed the appended form of application for admission and agreement as to terms of Membership, may be elected a Member by the Representative Board or by the Council of a recognized Branch.

The subscription is one guinea per annum, and each member is entitled to a copy of the Journal of the Association monthly, and to attend the Annual Meetings of the Association.

THE MIDLAND BRANCH OF THE BRITISH DENTAL ASSOCIATION.

EXTRACT FROM BYE-LAWS.

1. Composed of Members of the British Dental Association who reside in the Midland and North Western Counties of England, and of Associates who can fulfil the conditions laid down in the Bye-laws. The Annual Meeting usually takes place in June; and informal meetings are held in February and October.

2. The Association shall consist of Members and Associates. No one shall be eligible for membership who is not already a member of the British Dental Association. Any registered Practitioner of good character, who does not conduct his practice by means of the exhibition of Dental Specimens, appliances or apparatus in an open shop, or in a window, or in a show case exposed to public inspection; or by means of public advertisements or circulars

describing modes of practice ; or patented or secret processes ; or by the publication of his professional charges, may be admitted as an Associate. Associates shall be entitled to all the privileges of the Branch Association, but shall not be entitled to vote or hold office therein.

3. Any member of the British Dental Association may be elected a Member of the Branch by the Council of the Branch, at any of their ordinary Meetings, on his sending a written application for election to the Secretary of the Branch.

4. Any registered Practitioner who can subscribe to the conditions laid down in Bye-law 2, and who shall be recommended as eligible by any three members or Associates, may be elected an Associate by the Council, on his forwarding the recommendation and his subscription to the Honorary Secretary of the Branch.

5. The Annual Subscription to the Branch is as follows :—Members, Five Shillings ; Associates, Ten Shillings. The subscription to date from the time of election, and from the 1st of January in each subsequent year, and to be paid in advance, but Members or Associates elected in the months of October, November, or December, shall only pay one subscription for the remainder of that year and the following one.

Honorary Secretary, I. RENSRAW, 87, Drake Street, Rochdale.

METROPOLITAN BRANCH OF THE BRITISH DENTAL ASSOCIATION.

Composed principally of members of the British Dental Association practising within the London postal district. The Branch meets three or four times a year. One meeting in the Summer is devoted to Demonstrations, and the Annual Meeting is held in January.

The qualifications of Membership are similar to those in the other Branches.

Honorary Secretary, SIDNEY SPOKES, 59, Queen Anne Street, Cavendish Square, W.

BRITISH DENTAL ASSOCIATION, WESTERN BRANCH.

A person who is registered in the Dentists' Register shall be eligible for election as a Member of the Branch, provided he be of good character ; that he does not conduct his practice by means of the exhibition of Dental specimens, appliances, or apparatus in an open shop, or in a window, or in a show case exposed to public inspection ; or by means of public advertisements ; or circulars describing modes of practice, or patented or secret processes ; or by the publication of his scale of professional charges.

Any dental practitioner, being a member of the British Dental Association, who can subscribe to the conditions laid down in Bye-law 4, and has been recommended as eligible by any three members of the Branch may be elected a member of the Branch by the Council.

NOTE.—If the applicant be not previously a member of the British Dental Association, the Council has power to elect to the Association.

Hon. Sec., THOMAS ARTHUR GOARD, 6, West Southenhay, Exeter.

BRITISH DENTAL ASSOCIATION. EASTERN COUNTIES BRANCH.

Districts.

Norfolk, Suffolk, Cambridgeshire, Essex, Lincolnshire, Northamptonshire, Bedfordshire, Hertfordshire, and Bucks.

Bye Law.

Any Registered Dental Practitioner, who shall be recommended as eligible by any three members of the Branch, (one being from personal knowledge,) may be elected a member by the Council. The election to be by ballot; three black balls to exclude.

Honorary Secretary, W. A. RHODES, 3, Silver Street, Cambridge.

BRITISH DENTAL ASSOCIATION, SOUTHERN COUNTIES BRANCH.

The Branch shall consist of Members, Honorary Members, and Associates. *No one shall be eligible for Membership who is not already a Member of the British Dental Association.* Any registered practitioner of good character, who does not conduct his practice by means of the exhibition of Dental specimens, appliances, or apparatus in an open shop, or in a window; or in a showcase exposed to public inspection; or by means of public advertisements or circulars describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges; may be admitted as an Associate. Associates shall be entitled to all the privileges of the Branch Association, but shall not be entitled to vote, or hold office therein.

BRITISH DENTAL ASSOCIATION, SCOTTISH BRANCH.

A person who is registered in the Dentists' Register shall be eligible for election as a Member of this Branch, provided he be of good character: that he does not conduct his practice by means of the exhibition of dental specimens, appliances, or apparatus in an open shop, or in a window, or in a show case exposed to public inspection; or by means of public inspection: or by means of public advertisements; or circulars describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges.

Any dental practitioner who can subscribe to the conditions laid down in Bye-law 4, who has been recommended as eligible by any of those members of this Branch, may be elected a member by the Council, and shall be admitted a member of the British Dental Association.

Joint Hon. Secs., J. GRAHAM MUNRO, 16, George Square, Edinburgh, & REES PRICE, 163, Bath Street, Glasgow.

STUDENTS' SOCIETY OF THE DENTAL HOSPITAL OF LONDON, LEICESTER SQUARE, W.C.

The object of the Society is the consideration of matters generally and specially appertaining to Dentistry. The affairs of the Society are managed by a Council consisting of a President, two Vice-Presidents, Treasurer, two Secretaries, Curator, and nine Councillors, these Councillors consisting of five senior and four junior students. The President is chosen from the past Students who have obtained their degree of L.D.S.; the Vice-Presidents from past Students with or without qualification.

The entrance fee for ordinary members is half-a-crown, and there is an annual Subscription of the same amount.

Ordinary meetings are held at 8 p.m. on the second Monday in every month, from October to March inclusive during the winter Session, also a meeting on the second Monday in May during the Summer Session. The annual meetings for the election of officers and other business is held on the third Monday of January in each year.

Every member has the power of introducing one visitor, not being a Student of the Hospital or School, to the meetings, with the consent of the President. Visitors are invited to take part in the discussion of the papers and clinical cases.

There is a Library and a Museum in connection with the Society, both being under the superintendence of the Curator.

The Council offer a prize, value £3 3s., at the end of each year, for the best paper read before the Society during that year.

STUDENTS' SOCIETY OF THE NATIONAL DENTAL HOSPITAL AND COLLEGE, GREAT PORTLAND STREET, W.

This Society, which was established March 16, 1878, was constituted for the encouragement and diffusion of knowledge in Dental Science, and for the promotion of intercourse among its Members: and all Students of Dental Science are eligible for Membership. All candidates for Membership must be approved by the Council before being proposed to the Society for election. The Entrance Fee is 2s. 6d., and the Annual Subscription, 2s. 6d., to be paid in advance. The Ordinary Meetings of the Society are held on the first Friday in each month, from October to June, both inclusive, except October, May, and January, when they are held on the second Friday. The meetings commence at 8 p.m. precisely. Each member may introduce two visitors, not being Students of the Hospital or College, but the same visitors may not be admitted more than three times during one Session.

THE STUDENTS' SOCIETY OF THE VICTORIA DENTAL HOSPITAL OF MANCHESTER.

The object of the Society is the consideration of matters generally and specially appertaining to Dental Science, and for the promotion of intercourse amongst its members.

The affairs of the society are managed by a Council consisting of a President, two Vice-Presidents, Treasurer, two Secretaries, Curator and Librarian, Editor of Transactions, and not more than four Students of the Hospital.

The General Meeting is held on the last Tuesday in every month from October to March inclusive and the Annual Meeting is held in May of each year.

Every member has the power of introducing two Visitors not being Students of the Hospital to a General meeting with the consent of the President.

STUDENTS' SOCIETY OF THE DENTAL HOSPITAL OF LIVERPOOL.

This Society is constituted for the consideration of matters generally and specially appertaining to Dental Surgery.

Candidates for membership must be approved by the Council before being proposed to the Society for election. Such proposals are posted during one meeting of the Society, and remain so posted until the next monthly meeting when the candidate is balloted for. No candidate is elected unless he have the votes of two-thirds of the members present. Nine to form a quorum.

Every member has the power of introducing two visitors, not being Students of the Hospital or School, to the evening meeting, with the consent of the President.

An ordinary meeting is held on the third Friday in every month, from October to March inclusive; the chair is taken at eight o'clock p.m. The annual meeting for the election of officers and other business will be held in March, on the third Friday to receive the Treasurer's and Secretary's report.

STUDENTS' SOCIETY OF THE DENTAL HOSPITAL OF BIRMINGHAM.

The object of the Society is for the reading and discussion of Papers for the furtherance of Dental Science amongst its Members.

Candidates for Membership must be proposed, seconded, and elected at one of the Monthly Meetings.

Every Member shall with the consent of the President have the power of introducing a visitor to the meeting, who may take part in discussions, but is not entitled to vote on any business.

An ordinary meeting is held on the last Thursday in every month, from October to March inclusive, at the Dental Hospital, Newhall Street, commencing at 6 p.m.

The Annual Meeting for the election of officers and other business, will be on the last Thursday in October next.

The President is J. E. PARROTT, L.D.S. Eng.

All communications for the above Society should be addressed to A. WEST WALKER, Hon. Sec., Dental Hospital, Birmingham.

DENTAL ASSISTANTS' ASSOCIATION OF GREAT BRITAIN.

The above Association has been duly established, having for its objects :

The advancement and protection of Dental Assistants, and the temporary relief of Members when out of employment.

For further particulars apply to the Secretary, 30, Cursitor Street, Chancery Lane, London, W.C.

British Journal of Dental Science.

No. 665. LONDON, OCT. 1, 1895. VOL. XXXVII

NITROUS OXIDE ANÆSTHESIA.

By DUDLEY BUXTON, M.D., B.S.,

Member of the Royal College of Physicians ; Anæsthetist
in University College Hospital, and the Dental Hospital
of London.

It was recently stated in one of the leading journals published on the continent, and devoted to the interests of surgery, "that nitrous oxide has been almost entirely superseded in Germany by Bromethyl and Pental." Even in Great Britain the employment of nitrous oxide is not very common except in the larger towns of England. In the country districts, and in Scotland chloroform still reigns almost supreme, and not a few medical men are almost ignorant of the practical points involved in the administration of laughing gas. It is a very frequent occurrence to be met by patients who tell one that "Dr. So-and-So told her that she might take chloroform or ether, but not gas."

Within the past year or so, a gentleman writing from the provinces, rediscovered nitrous oxide, and in the columns of a London medical journal narrated his experience of a few hundred cases, and recommended its more frequent use, as it appealed to him as a safe and valuable anæsthetic!

Again, up to a very few years ago, nitrous oxide had no

place in the London hospitals, nor were medical students instructed either in its uses or merits. Whether every hospital possessing say, fifty beds, owns an apparatus for giving gas at present is, we think, very doubtful.

Thus it would appear that either nitrous oxide is an unsatisfactory anæsthetic, or its uses are restricted within too narrow a compass.

That many have relinquished its employment abroad is certain, but on the other hand in London, or perhaps in England, in those centres where it is used, and in America, the consensus of opinion is in its favour. Such an apparently contradictory state of things is reconcilable when we look into the matter. The fault, if fault there be, is not with the gas, but rather in the want of knowledge of its capabilities, and in the not altogether satisfactory methods of exhibiting it for the production of anæsthesia. Probably the views of those who contend that nitrous oxide is in point of fact not an anæsthetic at all, but simply an asphyxiant has done much to diminish the widespread acceptance of this body. Further, an increased knowledge of the action of nitrous oxide upon the human organism should have guided us into more approved ways of giving the gas, and have corrected many of the prejudices against its employment.

When nitrous oxide was first introduced there were not a few medical men who denounced its use as most dangerous, and refused to employ it for the healthy, much less for the weakly. Let us see whether the advances which have been made in our knowledge of nitrous oxide within the last decade or so, has borne the vaticinations of those who decried its use, or has shown their futility.

The objections urged then, and even now advanced against gas are (i) it is not a true anæsthetic, (ii), it is an asphy-

xiant* acting simply through its mechanical interference with due oxygenation of the nervous tissues ; (iii), it is a paralyzant of the circulatory system ; (iv), it produces such dangerous symptoms as albuminuria and glycosuria ; (v), it is, for various reasons, unsuitable for many persons ; *e.g.*, those who suffer from heart or lung disease, those who are anæmic, or plethoric, the weakly, the aged, or the very young ; (vi), it is unsuitable for many operations through the movements which accompany its administration (jactitation) ; (vii), the anæsthesia resulting from nitrous oxide is too short for any but the briefest operations.

It is proposed in this paper to consider these points, and to attempt to learn whether in the light of our present knowledge these objections hold, or are merely the result of a failure on the part of the objectors to grasp the true nature of the anæsthetic they are discussing, or to get out of its use all of which it is capable.

Wood† conducted some experiments upon dogs with the view to determine, first the time which elapsed between the commencement of the inhalation and the development of complete anæsthesia; second the effect of the drug upon the rate and character of the pulse ; third, the influence upon the blood pressure. His results, which we propose to give below, lead him to the conclusion that nitrous oxide anæsthesia is “ due to the shutting off the supply of oxygen from the nerve centre.” Wood divided his experiments into several series. In the first, dealing with nitrous oxide pure and simple, he found “ that the characteristic effects of the inhalation upon the circulation are : slowing of the pulse accompanied by a

* The term Asphyxiant is employed in this paper as implying deprivation of Oxygen, and not as equivalent to irritant gas.

† “ A research to determine the action of Nitrous Oxide, Nitrogen or Oxygen, and Carbonic Acid upon the circulation, with especial reference to nitrous oxide anæsthesia,” *Therapeutic Gazette*, Aug. and Sept., 1890.

pronounced increase of energy in the single heart movement, and extraordinary increase in the size and force of the pulse-wave, and followed very late in the poisoning, after the failure of respiration, by excessive rapidity and feebleness of the pulse, primary rise of the arterial pressure of variable extent, followed after a time, and often after unexplained vicissitudes of pressure, by a progressive fall of pressure to zero. The chief cause of the rise and fall of pressure has been shown to be vaso-motor stimulation and vaso-motor paralysis, while the slowing of the pulse is due to stimulation of the inhibitory apparatus. And Wood and Cerna further say from these and other experiments undertaken, to test how far the absence of oxygen in the blood brings about these results that "the conclusion that the anæsthetic and vaso-motor influence of nitrous oxide are in some way apart and separate from its action upon the pulse, would appear to receive confirmation from the experiments made upon nitrous oxide" itself. "The influence of nitrous oxide upon the pulse uniform in the different experiments, and consistent through the single experiment, whilst its influence upon blood pressure was not only very different in the different experiments, but also varied very curiously and unaccountably in the one experiment, the blood pressure rising and falling without any obvious rhythm or reason. It would look as though nitrous oxide acts upon the heart and nervous system directly, but has little or no direct inherent influence upon the vaso-motor centres or the brain cortex." In a further series of experiments undertaken with nitrogen these observers found the results obtained with nitrogen and nitrous oxide when contrasted showed "that anæsthesia is produced more rapidly when nitrogen is used." This, however, as Wood and Cerna themselves point out, is probably not true, as their nitrogen experiments were too few to average, and owing to a faulty valve, air probably entered with nitrous

oxide, and this delayed anæsthesia. They continue "Our experiments therefore, indicate a parity of action between nitrogen and nitrous oxide, and make it very probable that the two agencies act in a similar manner,—that is, by shutting off oxygen."

A point of much importance to which we shall return later is, that these observers found that a close similarity existed in the blood changes produced by nitrous oxide and nitrogen, and those brought about by mechanical asphyxia.

Nor is this remarkable when we find that in the experiments made on dogs, loss of conjunctival reflex was taken as the initial sign of anæsthesia, and it seems probable that even this was not noticed until some seconds after it appeared. Dogs, it may be noted, have singular persistence of conjunctival reflex, as is not unfrequently found also among human beings the ocular phenomenon remains in abeyance, although no appearance (and in the case of the latter, no sensation) of pain is present.

Indeed very much of the research undertaken by Drs. Wood and Cerna leaves one in doubt whether they succeeded in eliminating the results due to oxygen deprivation. Certainly the phenomena which they attribute to nitrous oxide are not developed, if care be taken to avoid asphyxial complications. It is probably true that the "action of nitrogen is certainly simply that of an inert substance which shuts out oxygen," but other observers have failed to be convinced when it is added, "the anæsthesia produced by the inhalation of nitrous oxide is due to the shutting off of the supply of oxygen from the nerve centre."

In some further experiments, results important to us in our present article, were obtained. Dogs were made to inhale in the first place oxygen, and then carbonic acid. It was found that pure oxygen exerted no influence upon the circulation. Carbonic acid when breathed into the lungs alone

produces sometimes a slight initial rise of blood pressure but this is always followed by a fall, but when diluted, especially if diluted with oxygen, a rise of arterial tension is caused. The carbonic acid would appear when properly diluted to stimulate the vaso-motor centre, thus producing a rise in blood pressure and by stimulating the cardio-inhibitory centre it lowers the pulse. These points were shown by section of the vagi and section of the spinal cord. Wood concludes, "these experiments prove that, after section of the spinal cord carbonic acid is powerless, even when well diluted, to cause rise of the arterial pressure, and as a corollary from this that the rise of the arterial pressure which is produced in the normal animal by inhalation of diluted carbonic acid is due to stimulation of the vaso-motor centre in the medulla (oblongata). The fall of pressure is probably due to vaso-motor palsy."

But as Paul Bert had stated that with a mixture of 85 per cent. of nitrous oxide and 15 per cent of oxygen anæsthesia was produced under pressure, Wood investigated the action of smaller percentages of oxygen mixed with nitrous oxide. The dog was first given pure nitrous oxide, then after a sufficient lapse of time, nitrous oxide mixed with 3 per cent. of oxygen was given, then nitrous oxide with 5 per cent. of oxygen, and then mechanical asphyxia was produced. The absence of corneal reflex was taken as the sign of loss of consciousness. We will simply take the results without going further into these experiments.

In the five experiments the times required to produce complete anæsthesia were :—

(a) Pure Nitrous Oxide.

1 :—3 min. 27 sec.

2 :—2 „ 10 „

3 :—2 „ 15 „

4 :—1 „ 30 „

5 :—1 „ 45 „

NITROUS OXIDE.

(b) Nitrous Oxide with 3 per cent. oxygen.

1 :—4 min. 37 sec.

2 :—5 „ 30 „

3 :—5 „ 30 „

4 :—3 „

5 :—2 „ 50 „

(c) Nitrous Oxide with 5 per cent. oxygen.

1 :—No anæsthesia produced.

2 :—15 min. 30 sec.

3 :—15 „ 30 „

4 :—19 „

5 :—23 „

These give an average of 2 min. 13 sec. for nitrous oxide; for nitrous oxide plus 3 per cent. oxygen, 4 min. 17 sec. and for nitrous oxide plus 5 per cent. of oxygen to 18 min. 15 sec. We have not added the asphyxia experiments as they do not affect us at present. Briefly we may summarise Professor Wood's view. He regards nitrous oxide as producing anæsthesia by excluding oxygen and believe that "theoretically it is possible to get a mixture of oxygen and nitrous oxide which will contain sufficient oxygen to maintain for a length of time the vital function, and yet have so little oxygen that consciousness would be lost." But he regards such a mixture as more of theoretical than of practical interest, for he says, "the danger of passing suddenly from anæsthesia into sensibility, or from partial into complete asphyxia, would always be too imminent." The views of Professor Wood must always command the utmost respect, but certainly the experience we have now obtained from the daily use of nitrous oxide pure, and the same agent diluted with oxygen must make one hesitate before accepting in their entirety the conclusions at which he has arrived. One would freely admit that if nitrous oxide were simply an asphyxiant, then the addition of oxygen would

merely stave off the *besoin de respirer*, but it is at least doubtful, whether these experiments do prove this. The research which was made by the writer went to show nitrous oxide possesses anæsthetic properties which place it out of the category of most gases, such as nitrogen. The fact that oxygen if given in sufficient quantity will delay or even abrogate anæsthesia does not, it is contended, prove the converse of the above statement. It simply shows that as we have always known, nitrous oxide must be administered in a definite quantity for each person before anæsthesia is established, and if you can by introducing small quantities of oxygen enable the patient to go on taking in nitrous oxide, you obtain a more complete and prolonged anæsthesia.

What has always constituted the greatest difficulty in all these researches, is the elimination of the obtruding phenomena of asphyxia. These must appear sooner or later in nitrous oxide administration if special precautions are not taken to avoid them, and to limit the inhalation to the production of nitrous oxide intoxication. Wood believes with some French experimentalists that anæsthesia is not produced until the oxygen in the blood has reached 3 or 4 per cent., then the higher centres being oxygen starved cease to recognise pain. Normal arterial blood* should contain 20 volumes of oxygen in a hundred volumes of blood and venous from 8 to 12 volumes, so a somewhat wide margin is left. Indeed it would seem very improbable that anything approaching such a reduction takes place in any ordinary administration of nitrous oxide, since but little congestive cyanosis is present, nor is the blood which flows when the tooth is removed deeply venous as one would anticipate it to be under such conditions.

Another physiological fact which must be borne in mind in this connection, is the extravagant way in which we

* See "*Foster's Physiology*," p. 310.

habitually supply our lungs with oxygen. We possess a comparatively weak oxygen atmosphere in the ultimate recesses of our lungs in the air cells, and discard in our exhaled air more oxygen than we store up. The average time occupied in inducing anæsthesia by nitrous oxide is probably about sixty seconds* or about sixteen respirations. During this time the tissues would have to subsist upon the 20 per cent. of oxygen it contained, and do without the amount it should receive at each inspiration.

Whatever view then we may adopt as to how nitrous oxide produces anæsthesia, we cannot fail to see that the utmost care is required to avoid the results of the concurrent shutting off of oxygen. All observers are now in accord with regard to the direct effects of nitrous oxide upon the circulation. The older view that a weak heart contra-indicated the employment of nitrous oxide is now exploded. Wood's experiments show most conclusively, as he himself points that out, the blood pressure is always maintained until long after the complete cessation of respiration, "the animal dying through the respiration, and not through the heart."

This was demonstrated in the experiments which the writer of the paper made in 1886, and which were described the Proceedings of the Odontological Society.† So that when we exclude such heart conditions as are likely to be aggravated through interference with the passage of blood through the lungs, *e.g.*, advanced mitral disease with anasarca—we may for the present disregard the effects of nitrous oxide in the circulation, and confine our attention to its effects on respiration. Later on it will be necessary to speak

* Odontological Society Committee gave an average of 73 seconds. Silk gives his average as 67.5 seconds, and Hewitt as 51 seconds. My experience is to give about 58 seconds.

† "Transactions Odontological Society," New series, vol. xviii. & xix

of certain blood conditions, *e.g.*, chlorosis and anæmia, and other pathological lesions supposed to contra-indicate the employment of nitrous oxide, *e.g.* glycosuria.

The key of the whole situation as far as nitrous oxide anæsthesia concerns human beings, is that no purely asphyxial phenomena need occur. Asphyxia, according to Sir George Johnson* produces : 1. Distention of the left cavities of the heart ; 2. Enormous distension of the right cavities, with diminished distension of the left. This is due, he thinks, to arterial contraction, and not to paralysis of the heart's walls by the circulation through them of venous blood. Death then in asphyxia is due to arrest of the pulmonary circulation due in its turn to contraction of the pulmonary arterioles. The ultimate cause of death is however, the poisoning of the nerve centres with venous blood. The production of these changes takes some time. Sir George Johnson who regards nitrous oxide as an asphyxiant, found that the time of the onset of asphyxia was shorter when nitrogen, or nitrous oxide, was given, than when oxygen was mechanically excluded, and explains this circumstance by the power these gases might possess of ousting the oxygen from its oxyhæmoglobin combination. On the other hand, all his conclusions as in the case of Drs. Wood and Cerna are based upon the assumption that no anæsthesia can follow the use of nitrogen or nitrous oxide, until the oxygen tension in the blood has reached that which is present in asphyxia. It may be presumed that such an anæsthesia must be fraught with danger, and that death from pushing the asphyxia a hair's breadth too far, would be no uncommon incident in the dentist's room. Our clinical experience, as will be further shown below, does not bear out any such assumption. Indeed the most careful cardiographic and sphygmographic tracings have failed to show that

* "On the Physiology of Asphyxia."

anything approaching the circulatory changes of asphyxia are present in nitrous oxide anæsthesia.

The excessive time which Professor Wood's animals were in going under with the gas, or mixtures of it with oxygen, and the fact that in all the experiments, no limiting point is taken between the onset of anæsthesia and the supervention of asphyxia, places them upon quite another platform from the ordinary nitrous oxide anæsthesia. But it is quite possible in the latter case to repeat the experiments, and unhappily, this has been done in one or two instances, with a fatal result. Of these we shall speak later.

In a lesser degree, either through inexpertness, accident or carelessness, commencing asphyxia is allowed to obtrude itself when anæsthesia alone was called for, and with the onset of such symptoms danger to the patient must inevitably occur. This danger becomes greatly increased if from some intercurrent pathological lesion there is incipient asphyxia at the time of the administration. For example, in all obstructive pulmonary diseases. Chronic bronchitis, for instance, by hampering breathing keeps the blood always below its due oxygen standard, and would, were any other agency brought to work with a similar tendency, rapidly produce the asphyxial state.

It will then be our object to elicit firstly, what are the conditions which have caused accidents or fatalities under nitrous oxide, and then to seek whether there is any cause inherent in the modes of producing nitrous oxide anæsthesia which necessarily bring about these dangers.

(To be concluded).

ORAL SURGERY.

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Eng.

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(Continued from page 822.)

CHRONIC ALVEOLAR ABSCESS.

There are two forms of chronic alveolar abscess, the *fistulous* and the *blind*.

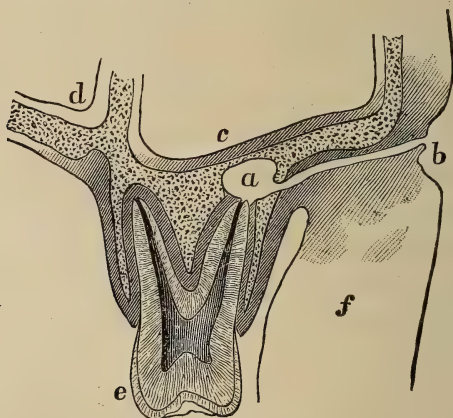


Fig. 16.—Chronic Fistulous Alveolar Abscess.

(a) Abscess cavity connected by narrow fistula with (b) opening on cheek. (c) Antrum. (d) Nasal cavity. (e) Tooth. (f) Cheek.
(From the *American System of Dentistry*.)

The fistulous variety is nearly always the sequel of an acute abscess which has failed to heal owing to the exciting cause remaining in action, but in some cases the inflammatory process may have been chronic from the first. The orifice of the fistula is as a rule situated at the spot where the original abscess burst, this being as already stated on the

gum, over the affected root ; but the original opening may close and a second one may form in some other situation with or without an exacerbation of the inflammatory symptoms. This process may be many times repeated, so that eventually the discharging opening may be far removed from the original source of trouble. The direction followed by the pus is determined by the resistance of the tissues encountered and by gravitation ; hence it happens that the opening is usually found below the source of the pus.



Fig. 17.—Chronic Alveolar Abscess, exposing root of Superior Incisor.
(*Museum of St Mary's Hospital.*)

In the case of the lower jaw, the pus may find its way to the surface near the lower border of the bone, or entering the cellular tissue of the neck it may travel downwards even as far as the clavicle. In the upper jaw the opening when on the face is most commonly found just below the prominence of the malar bone in the centre of a rounded depressed scar fixed to the bone by a fibrous cord (Fig. 16).

Sometimes the pus may burrow in the direction of mucous surfaces other than the mouth ; an abscess at the root of an upper incisor may sometimes discharge into the nose, leading to a mistaken diagnosis of ozæna being made. Abscesses at the root of the upper molars, especially the first, may open

into the antrum producing an empyema of that cavity (Fig. 18).

The blind variety of alveolar abscess has no external opening, and is simply a collection of pus in a bony cavity formed around the root of the affected tooth. A blind abscess may result from the closing of a fistulous opening, but as already mentioned, the usual course is for the pus to find vent again either at the same, or at some other spot. In other cases, the bacteria from the pulp chamber, being of but low pyogenic power, may have set up suppuration of such an extremely

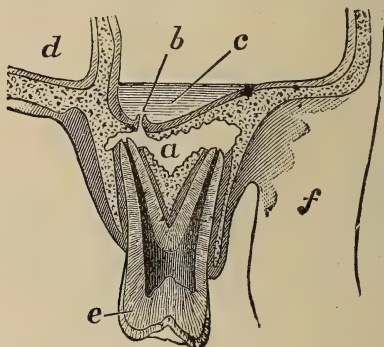


Fig. 18.—(a) Alveolar abscess at the root of an upper molar discharging into antrum at (b). (c) Pus in antral cavity. (d) Nasal cavity. (f) Cheek. (From the *American System of Dentistry*.)

chronic kind, that the resulting abscess has remained quiescent, and has never sought an external opening.

Symptoms. When the opening of a chronic fistulous alveolar abscess is immediately over the root of a carious tooth, the condition is at once recognized on inspection, but when the opening is remote the difficulty of diagnosis may be much greater. In such cases the employment of a fine probe may trace the sinus in the direction of a carious tooth, but sometimes the track is so narrow and devious, that we do not gain much information by this means. In doubtful cases the condition of the teeth should always be carefully inquired

into, and it should be borne in mind that the offending tooth is not necessarily a decayed one ; a tooth pulp may die, and lead to apical trouble, while the tooth still retains appearances of integrity which may deceive those not experienced in dental affections ; again, the offending tooth may be "impacted," and therefore out of sight. Not unfrequently the sinus is kept open by the presence of a small sequestrum, and will not close until this has been removed.

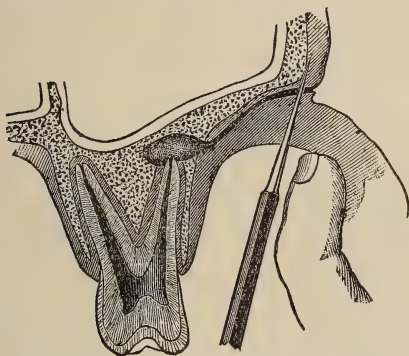


Fig. 19.—Operation for freeing depressed scar of face.
(From the *American System of Dentistry*.)

Treatment. The treatment of a chronic alveolar abscess consists in rendering the pulp cavity and apical space of the offending tooth aseptic. If this cannot be accomplished, or the prospective utility of the tooth does not warrant the attempt, extraction should be performed. When the case is complicated by necrosis, the sequestra should be removed as soon as they are loose. Even when necrosis has involved a considerable portion of the alveolar border, the loosened teeth may sometimes be saved by careful dental treatment, and the new bone thrown out from the periosteum will afford in time a firm socket. In cases of abscess discharging on the face an attempt should be made to divert the discharge into the mouth. The depressed scar which is left by such an

abscess as the one depicted in Fig. 19, may be much improved in appearance by dividing the fibrous band which binds it down to the jaw by a fine tenotome entered from the mouth.

NECROSIS OF THE JAWS.

Causes. The immediate cause of necrosis is deprivation of blood supply. This may be brought about in different ways; it may be the direct result of injury, a portion of bone being broken off and completely severed from all vascular supply; but in the majority of cases necrosis results from inflammation of the bone or its periosteum, the circulation being arrested by the pressure of the inflammatory exudation. Inflammation leading to necrosis may be due to several different causes; it may have started in a neighbouring tissue and have spread to the jaw, (*e.g.* cancrum oris); it very often starts in connection with a decayed tooth; it may be the result of certain chemical substances, such as caustics, mercury, and phosphorus; it may be due to the presence in the blood of the specific poison of such diseases as Small Pox and other Exanthemata, Acute Necrosis (infective panosteitis) Syphilis or Struma; lastly, the cause of the inflammation may be undiscoverable; it is then spoken of as “idiopathic.”

The causes of necrosis may be arranged in tabular form thus :—

CAUSES OF NECROSIS.

1. Injury.
2. Spread of inflammation from—
 - (a) Dental Disease.
 - (b) Cancrum Oris., etc.
3. Chemical Agents—
 - (a) Caustics
 - (b) Mercury
 - (c) Phosphorus.

4. Blood disorders—

- (a) Exanthematous fevers.
- (b) Infective panosteitis (acute necrosis).
- (c) Syphilis.
- (d) Struma.

5. Idiopathic.

Pathology. The mandible is more liable to necrosis than the maxilla ; this is owing to two causes ; firstly, the mandible is largely composed of compact osseous tissue, and therefore inflammatory products are pent up under great tension and stasis of the circulation is very apt to result ; secondly, the mandible is almost entirely dependent for its blood supply on the two mandibular arteries, which are deeply placed and almost isolated from collateral circulation, whereas the maxilla enjoys a rich blood supply from numerous vessels which anastomose freely.

The process by which the bone perishes and becomes cast off as a sequestrum, does not differ from that occurring in other bones, but the process of repair presents certain peculiarities deserving of notice.

In the maxilla repair is remarkably feeble. As a general rule in adults there is no repair whatever ; a gap remains and is not filled in. In a very few cases some formation of bone has been noticed, but these are quite exceptional. In children the gap becomes filled up to a large extent by fibrous tissue, but no new bone is developed.

In the mandible the process of repair is remarkable for the completeness with which it is often carried out, although a few cases of non-repair are on record. As soon as the acute inflammation has subsided, the periosteum begins to throw out new bone and encloses the sequestrum in a casing which is perforated by cloacæ through which pus escapes. When the sequestrum has escaped, or has been removed, the cavity thus left is rapidly filled in by granulation tissue which sub-

sequently ossifies. In this way, large portions of the jaw may be reproduced; the museum of St. Bartholomew's Hospital contains a remarkable specimen, showing how complete this reproduction may be. The patient, a lad of 18, from whom the specimen was obtained, suffered from phosphorus necrosis; six months before death, the whole of the mandible was extracted, in a few weeks there was evidence of formation of new bone, and the process extended with such rapidity that at the time of the patient's death, the whole bone with the exception of the alveolar process had been reproduced, the new mandible resembling that of an old edentulous person. Heath mentions a case in which he extracted several large sequestra, including the right condyle, and yet such perfect repair ensued, that the movements of the jaw were as free as if the articulation had not been interfered with.

In patients who survive it is found that the reproduced bone is not permanent, but slowly becomes absorbed being reduced to a mere arch; this is probably an example of atrophy from disuse; the new member being edentulous, is not sufficiently exercised to preserve its nutrition. As a general rule the teeth belonging to the necrosed piece of bone are lost, but this does not always happen; sometimes the alveolar border escapes death and is still able to retain the teeth *in situ*.

Symptoms. The symptoms of necrosis vary considerably in different cases, and will be described when dealing with the different varieties of necrosis (see below). At present it will suffice to say that the symptoms may be grouped under three chief heads.

(a) Those of the disease of which the necrosis is the result.

(b) Those directly due to the presence of the sequestrum.

(c) The constitutional effects.

Treatment. The following indications are common to most cases of necrosis.

(a) *Treatment of the Cause.* When possible the cause should be removed before the evil effect is produced ; thus in those who work in phosphorus, or mercury, precautions should be taken to prevent these substances from producing necrosis (see below) and in suppurative affections of the jaws, care should be taken to prevent separation of the periosteum, by making timely incisions.

(b) *Evacuation of Pus.* Free incisions should be made (from within the mouth if possible) so as to provide free drainage ; retained pus is apt to decompose, and to aggravate the local condition as well as the general health.

(c) *Antisepsis.* The mouth must be kept as clean as possible, by the frequent use of mouth-washes of Condyl's Fluid, or Boracic Acid ; if the patient is unable to use a mouth wash, the parts must be well syringed, or mopped over with absorbent cotton wool, steeped in some suitable antiseptic, and then dusted with Iodoform, or Boracic Acid powder. Cavities in the bone may be lightly packed with sal alembroth gauze soaked in Glycerine emulsion of Iodoform.

(d) *Removal of Sequestra.* Sequestra should not be removed until they are loose, but if a projecting piece of dead bone is a source of much annoyance, a portion of it may be clipped off with bone forceps even though it is not yet detached. In cases of extensive necrosis the sequestrum should not be removed until the case of new bone has attained sufficient strength to preserve the outline of the parts. When the whole bone has necrosed it is necessary to divide it at the symphysis to extract the sequestrum. Incisions for the removal of sequestra should be made within the mouth when possible ; when occasion necessitates their being made from without they should be planned so that they may leave as little deformity from scarring as possible.

Some surgeons prefer to remove the dead bone at as early

a period as possible without waiting for it to become detached, but the plan is not to be recommended.

(e) *Constitutional Treatment.* The patient's food must be adapted to the condition of his mouth ; as mastication is in most cases impossible, the diet must be restricted to fluid, or soft solid articles, such as milk, soups, essences, eggs and finely minced or pounded meat. When the sequestrum is large and prolonged suppuration occurs, the judicious use of stimulants coupled with the exhibition of quinine and iron is desirable. The swallowing of pus is apt to derange the digestive system and necessitate the use of drugs to regulate the action of the bowels and improve the appetite.

TRAUMATIC NECROSIS.

Necrosis has already been referred to as an occasional complication of fracture of the jaws. It may be brought about in two ways ; (a) in a comminuted fracture a piece of bone may be separated from its vascular connections to such an extent that it dies ; (b) suppuration may ensue and pus may burrow beneath the periosteum, and by separating it from the subjacent bone lead to the death of the latter. In this way, much bone may be lost and great deformity and impairment of function may result. Necrosis should be suspected and looked for in any case of fracture which goes on suppurating and makes little or no attempt at union. The removal of the sequestrum will soon be followed by consolidation of the fracture.

Necrosis of a piece of alveolus may follow the extraction of a tooth ; this may be due to death of a small piece of bone which has been fractured during the operation, but is more often due to osteitis set up by the tooth before removal.

NECROSIS OF DENTAL ORIGIN.

Dental disorders may lead to necrosis in three ways ; (a) Acute periodontitis may, without the formation of an abscess,

extend to the alveolus setting up osteitis of sufficient intensity to produce necrosis. (Fig 17). Such necrosis may



Fig. 17.—Necrosis of Alveolus resulting from Osteitis set up by a carious tooth.

be limited to the socket of one tooth or may affect several; (b) an alveolar abscess may form in the manner already described and strip the periosteum from its bony attachment, instead of perforating that membrane and becoming evacuated. In this way extensive necrosis may result, especially in the lower jaw. In the upper jaw extensive lifting of periosteum may occur without producing necrosis, the bone being kept alive by the blood supply derived from its opposite aspect; (c) an abscess not unfrequently forms around an impacted lower wisdom tooth, the pus burrows, and strips up the periosteum causing death of the underlying bone.

NECROSIS SECONDARY TO ULCERATION OF THE MOUTH.

Necrosis may result from the invasion of the jaws in cases of cancrum oris, severe ulcerative stomatitis, or ulcerating malignant growths. In such cases the necrosis is of comparatively slight importance, the disease of which it is a complication being so formidable as to overshadow the lesser condition.

NECROSIS FROM CAUSTICS.

A very powerful caustic may cause immediate death of bone by destroying it in the same way that a piece of wood would be charred by strong sulphuric acid ; but when necrosis

follows the use of caustic substances, such as arsenious acid, or Chloride of Zinc employed in dental practice, it usually results from the application exceeding the action it was intended to produce and setting up acute inflammation in the adjacent bone.

MERCURIAL NECROSIS.

Mercurial necrosis was a common affection in the days when syphilis was treated by large doses of mercury, and when the drug was not considered to have done what was required of it unless profuse salivation was produced. It was also common amongst men employed in the manufacture of mirrors when liquid mercury was used. At the present day mercury is much more sparingly used in the treatment of syphilis, and the method of silvering glass in the manufacture of mirrors has been improved, so as to diminish the risk that the workers are exposed to, consequently mercurial necrosis is now a rare condition, being practically only seen in patients who are peculiarly sensitive to the action of the drug.

The effects of absorption of an injurious amount of mercury into the system are an unpleasant metallic taste and a general inflammatory condition of the mucous membrane of the mouth. The tongue becomes furred, tender, swollen and indented by the teeth. The gums become reddened at their margins, swollen and tender. The periodontal membrane becomes inflamed, the teeth loosened and raised from their sockets and tender when pressed on. The inflammation extends to the alveolar process setting up osteitis which may be severe enough to terminate in necrosis. In some cases the osteitis and resulting necrosis is not limited to the alveolus, but may involve the whole thickness or even the whole extent of the jaw. In St. Bartholomew's Hospital museum there is a specimen of necrosis of the whole of the lower jaw which followed the administration of a few grains of calomel in a

case of fever ; it is possible that in this case the fever itself may have been a part cause of the necrosis.

In cases of chronic mercurial poisoning the hands and arms become tremulous, the patient becomes cachectic, sallow, emaciated and weak.

The most important point in the treatment of mercurialism is to remove the patient from the baneful influence of the drug before serious harm has resulted. The elimination of mercury from the system may be hastened by the administration of iodide of potassium. The catarrhal condition of the mouth is best treated with frequent rinsing with a two per cent solution of Chlorate of Potassium. Should necrosis ensue it should be treated on the principles already indicated.

PHOSPHORUS NECROSIS.

Phosphorus necrosis was unknown prior to the invention of lucifer matches ; it was first recognized in this country some ten years after the establishment of manufactories in London, although the disease had been previously recognized in Germany by Lorinser. The disease is caused by the inhalation of fumes emanating from phosphorus, consisting chiefly of phosphorous and phosphoric acids (H_3PO_3 and H_3PO_4). These fumes become dissolved in the saliva, and act locally upon the alveolar periosteum, which they reach through carious teeth. In opposition to this statement, various writers have held the following three views, all of which are probably wrong :—(a) that the disease is caused by arsenic, which is sometimes admixed with the phosphorus, (b) that the phosphorus is absorbed into the system and reaches the jaws by the circulation instead of directly by the saliva, and (c) that it occurs in persons with sound teeth.

The two jaws are about equally liable to the disease; if anything, the mandible is affected slightly more often than the maxilla. The disease usually does not show itself until the

worker has been exposed to the fumes for a long time, probably never under a year. On the other hand, it may occur some months after the person has ceased to have anything to do with phosphorus. The early symptoms are those of periodontitis. There is toothache, at first intermittent, but afterwards continuous. The gums swell, and become separated from the necks of the teeth, which are loose and tender on pressure. Pus wells up from the sockets. The tissues of the cheek are always much swollen; in some cases when the inflammatory symptoms are at their height, the swelling may involve the whole side of the head and face, and even the neck. In most cases openings form upon the face as well as inside the mouth, and from them pours a copious discharge of sanious offensive pus. The constitutional symptoms are severe and are due to septic absorption, to the ingestion of decomposing pus, to inability to take food, and to the severe pain which is endured. Death may occur at an early period, when the inflammatory condition is at its height, or the patient may survive this stage to perish later from exhaustion, due to long continued hectic and suppuration. In some cases recovery with extensive scarring and deformity ensues.

No repair occurs in the maxilla, but in the mandible the new bone formed by the periosteum closely resembles pumice stone, and adheres firmly to the sequestrum, some of it usually coming away when the latter is removed. Microscopically this pumice-like deposit presents the following peculiarities :—The Haversian canals are very large, and are at right angles to the bone, instead of parallel to it; they interlace and end with open mouths on the surface; the deposit is laminated in structure, and its matrix is brittle and powdery. This curious formation is almost peculiar to cases of phosphorus disease, but has occasionally been met with in necrosis due to other causes.

The most important point in the treatment of phosphorus

disease is prevention. Amorphous phosphorus is innocuous, and should always be employed instead of the injurious variety. Persons who are compelled to work with ordinary phosphorus should observe scrupulous cleanliness and should work in well-ventilated rooms. They should take great care of their teeth, and should have any carious spots carefully filled. No person with carious teeth should be exposed to the fumes of phosphorus. Should the disease occur the person affected should be at once removed to healthy surroundings and any suspicious teeth extracted; any swelling of the gum should be very freely incised. When necrosis has actually occurred treatment must be conducted on the general principles already described.

(To be continued.)

SURGERY FOR DENTISTS.—Dr. J. L. Williams, of Boston, in the course of a discussion on "The Common Ground of Medicine and Dentistry," recognised the necessity of the dentist having a more extended knowledge of the principles of physiology and of surgery. Such knowledge would often save the dentist from making serious mistakes. He described a case in which a dentist with a first class reputation as a skilful operator, and especially in correcting irregularities of the teeth, had a patient, a clergyman, who applied to him on account of faulty articulation which interfered with the plainness of his speech. On examination it was found that the front teeth did not occlude at all, and the dentist concluded to build them down with gold. He worked on these teeth several hours a day for four or five successive days, till the constant nervous strain, and the continual shocks to the brain from condensing the gold, caused the complete breakdown of the patient with paralysis, followed in a few months by death. A better knowledge would have taught this dentist that he was putting the nervous organization to a dangerously severe test.

British Journal of Dental Science.

LONDON, OCTOBER 1, 1895.

PROFESSIONAL ETHICS.

At the recent meeting of the British Medical Association in London, there was, for the first time, a Section for the discussion of Ethics. Amidst the stress of professional life, and the increasing competition in the medical ranks it seems likely that much misunderstanding amongst practitioners would be obviated, and that the Public would also gain, if some general consensus of opinion could be arrived at. No doubt to some rough and ready heroic minds, a go-as-you-please arrangement would be satisfactory ; but for those who recognise that the maintenance, or even the raising, of the status of their profession is advisable, the formulation of certain rules of conduct would be welcome. Dr. Styrap's well-known code has, no doubt, been of excellent service, but its acceptation is after all only that of an "unwritten law."

Although the circumstances surrounding Medical and Dental practice are by no means identical, yet there is sufficient of mutual interest to render the discussion of Ethics by medical men attractive to the dentist, and it is probable that as the position of the latter improves, his concern in such matters will be increased. As an instance, there is, we fear, too little consideration shown for the professional character of a brother practitioner when patients attempt to get an opinion as to the value of treatment carried out on some former occasion, say in a case of Irregularity, or as to the skill with which some operation has been performed. A certain proportion of patients, some by choice, some by necessity, are migratory, and it is always safe to express a

guarded opinion. The circumstances under which treatment is carried out, and the personal equation of patients, are so varied, that unless one knew all the details of the case, that is to say, had been present at the performance of the operation it would be unfair in many instances to express an adverse opinion. This is only one of the many incidents which may occur in daily practice and which for the honour of the profession, and (we contend) often for the benefit of the patient, require consideration. Unfortunately the Dentists' Register still contains the names of some who may possibly deserve but scant courtesy, and even merit condemnation.

One of the papers read at the Section mentioned, dealt with "Professional advertising," a subject much discussed in Dental circles. It is a difficult matter especially when one tries to draw a line as to what does and what does not constitute advertisement. But upon the broad question, we are glad to find that Dr. Potter, who read the paper, took the same ground which we have previously adopted as to the difference between professional and commercial methods, and we cannot resist the temptation of closing our remarks with a quotation which speaks for itself. "What, then, are the exact points in which professional advertising is unethical? The answer to this question has two aspects of chief importance, a public and a professional aspect. The public aspect is this, that a medical adviser can by no means perform with certainty any promises of cure he may make to the public in his advertisements. An advertiser who offers the public soap or tea can supply with absolute certainty tea or soap of the quality and quantity he promises in his advertisement. No medical man can with certainty effect any cures he may promise to make, even of comparatively trifling diseases, much less of diseases of a more serious and dangerous nature. From the standpoint of the public, therefore, medical advertising is not only undesirable but it is fraudulent. It is fraudulent in that it secures money by means of promises which it knows it cannot with certainty perform. Medicine can guarantee services and

that is all; results it cannot guarantee; and, just because it cannot guarantee certain and definite results, it cannot, like the manufacturer or merchant, honestly advertise."

A MICROBE FOR SCURVY.—Two Italian observers have been making experiments upon guinea-pigs and rabbits with cultures of a micro-organism which they isolated from scorbutic gum. The inoculation caused fever, and *post mortem* examination showed hæmorrhagic stains in various parts of the body and formation of nodules of new connective tissue. The microbe is a diplococcus, and quite different from any usually found in the mouth.

HOSPITAL ABUSE.—Dr. Waring wrote to *The Lancet* with respect to the abuse of the Brighton Hospitals. One of the Staff of the Sussex County Hospital now draws attention to a paragraph from the annual report which shows that a searching scrutiny was made in 1894, by a sub-committee. As a result it was found that 96 per cent. of the out-patients were entirely fit and proper subjects for gratuitous treatment, and it was thought that if sufficient information could have been obtained in the remaining 4 per cent. it might be shown that several of even these cases could be received without any abuse to the charity. Dr. Richardson suggests that the primary cause of hospital abuse is the carelessness with which subscribers give their tickets.

ANNEALING STEEL.—According to a statement in *Invention*, certain Americans have discovered improved methods of annealing steel. Their experiments were based upon an accidental discovery made at Alexandra in 1882, in connection with a fire. One of the houses burned was that of a dentist, and his workshop was not reached for seven weeks. When the clearance was made some dental files

were found to be so perfectly annealed that some, although half an inch wide, could be bent like lead. They had apparently been heated red hot, and afterwards cooled in such a manner as to produce the greatest possible softness. They began to crystallize after being bent several times.

THE VICTORIA DENTAL HOSPITAL.—A correspondent writes to the *Manchester Guardian* regretting the small amount of support given to the Dental Hospital. He thinks that the amount of suffering relieved, and the advice leading to the same which is daily meted out to some hundreds of poor people should appeal to the generous hearts who give donations to kindred institutions. A site has been bought for a new hospital, but is lying idle for want of building funds.

MEDICAL MEN AND ADVERTISING DENTISTS.—*The Lancet* considers it very remarkable to see in the newspapers puffing testimonials to advertising dentists written by medical men. There are two such in the *Deal and Walmer and Sandwich Mercury*. The Medical Journal asks "How is the profession of dentistry to be raised if members of the profession of medicine sanction such a system of advertising as they would be ashamed to use in their own case?" So far as the resort to advertising is concerned there is not much to choose between the two professions.

CYCLISTS' TEETH.—According to the *Sunday Telegraph* a dentist (unnamed) has discovered that cycling is developing a diseased condition of the gums and teeth. According to this alarmist paragraph, the extra effort in ascending hills and running races produces mouth-breathing and the overheated gums (*sic*) get congested by the cold air drawn in through the open mouth. "The face swells as with an ordinary toothache, pus forms around the teeth and loosens them." The pain is intense, and the treatment, we are told, frequently consists in extraction.

Abstracts of British & Foreign Journals.

PLASTICS AS A BAR TO BACTERIA.

By JOSEPH HEAD, M.D., D.D.S., Philadelphia.

"The perfect filling must be water-tight," so says the time-honoured axiom.

But a tooth is everywhere permeable by moisture, as can readily be demonstrated by dropping it, when dry, into aniline ink. It will be stained through and through. On superficial observation it might be thought that wherever moisture could penetrate so could bacteria, but this does not seem to be the case, as bacteria have not yet been found in normal dental tubules.

The ideal filling would be composed of a material that is waterproof, bacteria-proof, adherent, and a non-conductor of heat. And, moreover, a material that can readily be placed in the cavity without the slightest danger of marring the enamel edges.

With such a filling in position, the tooth would be as likely to decay as it was before decalcification occurred. But we have not yet found the ideal filling material.

Gold while it can be made to exclude bacteria from its own substance and from entrance at the edges of the filling, is a good conductor of heat, and can only be sufficiently hammered to make a perfect seal in teeth of dense structure. There is no doubt that gold can be made waterproof, as the Bonwill mallet has demonstrated time and time again. Teeth have been partially contoured one day and completed the next, perfect welding having been accomplished after the thinnest film of the moistened gold has been removed. But soft-foil fillings that have such a record for preserving teeth have been put in under water with lasting results. Does this filling preserve the teeth by starving out the micro-organisms? This supposition can hardly hold, as soft-foil fillings have been removed from cavities in an evil-smelling state by means of the explorer, and the dentine beneath appeared sound and dense.

Tin would seem pervious to moisture, as any old filling can readily be separated into portions that only partially adhere. It has not been proved, one way or the other,

whether it admits bacteria ; but at least it can be said to preserve tooth-structure in a manner very different to soft foil.

Amalgam in itself is water-proof, but leaks at the cavity margins. Each year we hear of some wonderful alloy that will not shrink from the walls ; but in my opinion, that amalgam has not yet been discovered. Reducing the mercury to a minimum will do much, but it has been my experience that amalgam fillings of my own and those of my fellow practitioners all show some slight shrinking from the enamel after some five or six years. But even granting that all these fillings had been badly put in, we still find when the bulging edges have been trimmed, that in spite of a palpable leak in many instances the cavity remained sound. It may be affirmed that metallic rust gets into the tubules and protects them. This is certainly some sort of an explanation, and yet it can hardly be accepted as conclusive.

Oxychloride of zinc and oxyphosphate of zinc, although adherent to the tooth walls, are readily penetrable by moisture and bacteria.

Gutta-percha, although practically if not absolutely impervious to moisture, invariably leaks at the cavity margins.

My experiments with gold, tin, and amalgam, are not yet completed, and so it is possible only to deduce from facts that are clinically well known ; but the assertions just made concerning the cements and gutta-percha seem to have been proved in the following manner.

Cones of oxychloride of zinc and oxyphosphate of zinc were made, having a hollow place within that was absolutely excluded from the outer air. Harvard and Pierce's oxyphosphate of zinc was used that became hard as ivory. Some of the oxychloride of zinc cones were made from calcined powder some from the uncalcined. Those made from the calcined powder became extremely dense.

These cones were sterilized in a steam bath by the intermittent process in the following way : First, they were boiled in water two to three hours ; then removed from the bath and placed in glass jars, the mouths of which were closed with absorbent cotton, and subjected to steam over the water-bath for one hour. They were then allowed to cool for seven hours in an atmosphere of about 70 deg. F.; again subjected to steam for one hour, and cooled over night. Next morning again heated for about an hour. Allowed to cool eight hours. Four hours steam heat, twenty-four hours to cool ; one

hour steam heat, allowed to cool, and then placed in a bath that after being first sterilized had been tainted with a decayed tooth. At the end of five days' immersion they were taken out and opened. The bouillon had filtered through the substance to the hollows inside. The bouillon found within was swarming with micro-organism. The steam bath did not have the slightest effect on the oxychloride of zinc, but the oxyphosphate, from being very dense, seemed much softened. This might seem to depreciate from the value of that particular experiment; but it would still seem probable, if the micrococci could pass through strong oxychloride, that they could also pass through the oxyphosphate, that is so similar in substance. On drying the opened oxyphosphate cones, small shiny crystals lined the inside, which looked not unlike free phosphoric acid that had not become chemically united with the powder. And yet the cones before boiling were extremely dense.

The experiments with gutta-percha were as follows: Three canine teeth were taken and opened from end to end. The surfaces of the canals were thoroughly drilled away. One end of each was filled firmly with gutta-percha. A small pellet of cotton soaked with sterilized broth was then placed in the canal. The remaining openings were then dried and filled with gutta-percha. These were sterilized as follows: Two and a half hours in steam bath, four hours to cool, one hour in boiling water, two hours in steam bath, seven hours to cool, two hours in bath, two hours to cool, and placed in tainted broth for five days. At the end of that time they were taken out, dried, and passed rapidly once or twice through a Bunsen flame. The gutta-percha was then removed with a heated instrument, the cotton was taken out by tweezers previously sterilized in the flame, placed on a clean glass slide, and wet with two drops of distilled water. This water was then found to contain large numbers of bacteria.

If these facts are so, and the evidence would seem to indicate that they are so, what becomes of the fundamental principle involved in the statement that the edges of a filling must be bacteria-proof. We know that cohesive gold fillings are almost if not quite certain to admit decay if the edges are not thoroughly tight. Then necessity for bacteria exclusion would seem not to entirely hold in the case of soft foil. It may or may not be necessary with tin. It certainly is not.

absolutely imperative in the case of amalgam. With cement and gutta-percha it also does not seem to be an essential to tooth preservation.

And yet all of these filling materials save teeth, and save them well. Especially is it the case with cement and gutta-percha, that stop decay when nothing else will. These last preserve the cavity walls, and yet allow the bacteria to enter. This seems a paradox, and is difficult to explain. One might say that bacteria need air and food; that cement and gutta-percha shut the germs off from these necessities, and thus render them dormant. But this does not to my mind reveal why some soft, spongy, malodorous soft-foil fillings have preserved the dentine beneath from further decay.

The experiments just reported may seem to be a means of deducting new and startling facts, but in reality this is not so. Soft foil and amalgam foreshadowed these conclusions many years ago.

I should like to add one word for those who shall ever wish to sterilize teeth for bacteriological research. Do not do it in a vulcanizer under steam pressure. I placed fifteen teeth carefully prepared in a vulcanizer, and kept them there for one hour at a pressure of thirty pounds, temperature 260° F.

When they were removed almost all the albuminous material had been extracted. They would have served as excellent specimens wherein college students might easily and readily examine the position and size of the canals, but were hardly suitable for bacteriological experiments.

International Dental Journal.

FILLING MATERIALS.

By G. V. BLACK, M.D., D.D.S., Sc. D., Jacksonville, Ill.

Concluded from page 806.

The formula of the alloy controls in large degree the flow of the amalgam formed. This is more important than the percentage of mercury or the particular mode of manipulation, provided, of course, that the percentage of mercury be

reasonable and a *particular mode* of manipulation be followed.

The standard being sixty pounds for one hour on a cube 85 x 85 x 85 thousandths of an inch, or its equivalent,* a pure silver-tin alloy may be said to flow from two and a half per cent., the difference depending on the composition of the alloy, the fineness of the cut, and the special mode of handling. In this statement I am supposing the range of composition to be from forty per cent. of tin to sixty per cent. of silver, to the reverse proportions. The addition of a small percentage of copper to this seems rather to diminish the flow, and gives it a greater crushing strength. No other metal has come to me in the formulæ received the addition of which does not seem to directly and markedly increase the flow of the amalgam. While these increase the flow, they do not seem to very materially injure it in its crushing strength. Indeed the crushing strength proves to be no test of the stability of an amalgam. Its flow is the important test. Every silver-tin amalgam in the market, so far as I have seen is, when mixed with a sufficiently low percentage of mercury, strong enough so that they will not *break* down, they will not crush. The chief difficulty is that many of them will gradually change form under the stress of mastication, as it comes upon them thrust after thrust, year after year. When subjected to heavy biting they will finally be moved sufficiently to lose their perfect margins. This is the principal cause of that *black ditch* that is finally seen along the margins of silver-tin amalgam fillings that have been nice and perfect the first year. This does not occur along the margins of copper amalgam fillings. The copper amalgams do not flow. Experiments with them show that they hold their form perfectly under any stress short of that which crushes them. Therefore, when perfect amalgams are once made with copper amalgam, they remain perfect. Not so with the silver tin amalgams. Their disposition to flow under stress allows them to be moved in the teeth of those who bite strongly, and they lose their perfect margins in consequence of this movement. It is for this reason that I attach such importance to the flow.

Among numerous observations on this point, I have this one. A family of three grown up children required many amalgam fillings. These retained their margins perfectly during six years of observation. Another family of four coming to me at the same time had amalgam fillings also, in

* Equivalentents are found by the simple rule of proportion already stated.

about the same proportion. The cases seemed about equal as to the disposition to caries. The same amalgam was used in both and with the same care, but in three of the members of the second family not a filling that was exposed to the stress of mastication retained its margins for two years. That monster of silver-tin amalgam work, the black ditch, showed itself around every one of them. The appearances indicated that the recurrence of decay was because of imperfect margins not that decay caused the imperfect margins. These cases were an enigma to me, but when I studied them with the gnathodynamometer, I found that the children of the first family gave me a record of sixty to sixty-five pounds as the best that they could do after several trials on different days. The children of the other family gave me records of one hundred and sixty pounds and over without difficulty. Will any one doubt that the difference in the results in the fillings was due to the amalgam being sufficiently strong for those of the one family, but not sufficiently strong for the other? It is probable that most careful operators can duplicate the conditions described in their own practice.

So far as I have yet seen, any metal, except copper, added to a silver-tin amalgam increases its flow. Wherever the zinc occurs we have the same result, wherever gold occurs the flow is increased, and so on through the list. I do not know why these things are so; I only note the facts as they stand out in my experimental work.

When so small a proportion of a given metal stands out in an experimental work of this kind, what does it say for our makers of alloys for amalgams? They have told us they used pure metals, and here is an unexpected evidence that they have done so. I must regard the results of this experimental work as something of a monument to the integrity, skill, and strict fidelity of the men who compounded the alloys. If the metals were not pure, how is it that one-fourth of one per cent. of zinc stands out in the results on flow? How is it that 3 per cent. of platinum stands out in the results? It is the business of manufacturers to make what dentists want. Dentists have been calling for smooth-working alloys. They have been supplied. To this date neither dentists nor manufacturers have known of the flow of amalgams or of the effect of additions of gold, zinc, etc., upon the flow. This instability could not be avoided because it was not known.

Yet I must utter a note of warning against jumping too rapidly to conclusions. There is other important experimen-

tal work in progress, and whether or not definite use for these little additions to the silver-tin alloys may be found cannot yet be told.

Another phenomenon is beginning to take shape in this experimental work that had not been seen until recently. It appears that an amalgam first sets or becomes hard to a certain degree, and afterward a process of softening begins which affects the flow but not the crushing stress. Coincident with this, in several cases at least in which careful observations and comparisons have been made, an expansion of the mass has occurred. When this ends, what may be its extent or on what it may depend, has not yet been determined for any one of the amalgams. In the majority of cases in which I have looked for it, it has not occurred at all up to the seventh and tenth days. Yet what I have seen, when connected with the clinical observation at my command, leads me to suspect that it may be a serious matter, and one that will require months, and possibly years, of close experimental work to determine. It certainly does not occur in all of the silver-tin amalgams, and is probably controlled by the constituents of the mix ; that is, the whole formula, including the mercury. In my experimental work thus far, the proportion of mercury—between thirty and forty-five per cent.—has not seemed to have a very important influence on the flow of the mass, and some of the alloys will flow nearly the same with thirty per cent. as with fifty per cent. But this flow has generally been taken at from two to four days after the mass was made. What the effect of the proportion of mercury may be after the primary setting is unknown. The flow of an amalgam bears no fixed relation to the crushing stress, and nothing can be told of what it may be by crushing the mass. If it should be found that the cementing substance which is formed by a solution of a portion of the alloy in the mercury is a definite chemical compound formed by combining equivalents, and that these equivalents are gradually changed after the first setting of the mass, this depending on the formula of the alloy and the percentage of mercury, the question comes so complicated that there is little hope for a speedy solution of it.

This expansion occurring as a secondary change and slowly progressing, seems to explain certain clinical phenomena that have been very perplexing. I allude particularly to fillings in the buccal surfaces of the upper molars, in a

position in which no stress can come upon them in mastication. Some of these fillings become over full, apparently, after having been dressed evenly with the margins of the cavity. I can readily understand how a filling that is subjected to stress may be caused to present uneven margins by slow movement from the thrusts it must endure, but in many of the buccal surfaces of the upper teeth this cannot be the case. I have had a considerable number of old amalgam fillings, ranging from one to forty years old, from which I have cut blocks and tested them for flow. The most of them have shown a large percentage of flow, and none of them a very small percentage. In all of them what appears to be free mercury has appeared on the surface of the blocks when placed under a stress of fifty or sixty pounds. I do not find so much free mercury expressed from recent blocks as from the old amalgams, even though the flow may be as great. Of course, I have no data as to the amount of mercury mixed with these old amalgams, but the appearances suggest that in a rearrangement of the molecules after the first setting, some of the mercury may be thrown out of combination. This idea of the possible definite chemical form of the cementing substance formed in amalgams is not entirely new, as the literature will show.

SPHEROIDING OF AMALGAMS, SO CALLED.

Much has been said of the tendency of amalgams to assume the spherical form. My study of the subject leads me to the notion that this term has been derived from a misinterpretation of the phenomena seen. I have made hundreds of blocks of amalgam with sharp, square corners, using all possible proportions of mercury that would make a mass that would fairly *stand alone*, and removed them from the cavities at once, and have not in a single instance discovered a rounding of corners such as would be supposed to occur if the mass possessed a tendency to assume the form of a sphere. The corners remain sharp when the amalgam is hard,—that is, as sharp as the crystalline texture assumed by the general surface will permit. The phenomenon from which this term *spheroiding* has been mostly derived seems to be the disposition of amalgam fillings to rise up in the centre in rounded form, but partly from the difficulty experienced in making amalgam fillings with perfect margins. Of this latter point I will have more to say in the presentation of the question of shrinkage.

Amalgam fillings (especially experimental fillings for the study of the behaviour of amalgams) that have been dressed flat, may rise up in the centre and assume a spherical form from at least two different causes. An expansion of the mass may occur, as related above, and being confined by the cavity walls, the material will rise up in the centre in the same manner as ice forming in a strong drinking glass or other vessel will assume a spherical surface. This is because the ice flows under stress the same as the amalgam flows under stress. The two cases illustrate each other. Either, being firmly held on all sides but one, while expanding, will flow toward the point of least resistance, causing this spherical form of surface.

In the summer of 1894, Dr. E. K. Wedelstaedt, of St. Paul, Minn., sent me a slab with several amalgam fillings that had spheroided, and asked if I could account for it. The doctor had conducted a very elaborate series of experiments on the subject of the shrinkage and the leakage of amalgam fillings and in previous trials of the amalgams used in this slab they had not presented such phenomena. Having already studied the shrinkage and expansion of dentine in varying hygrometric conditions, and knowing also of the flowing of amalgams, I began looking the matter up from the hygrometric standpoint. I learned that the fillings in question had been made by Dr. George H. Cushing, at the request of Dr. Wedelstaedt, the previous April, during a term of very damp weather, the slab having been sent him through the mail. After the amalgam had set, the fillings were dressed flat and tested for leakage, and some days later they were sent to Dr. Wedelstaedt, at St. Paul, who, after having examined them, laid them away. In reviewing his experimental work in the latter part of the summer, he found that the fillings in this particular slab had spheroided. Believing now that this had been caused by the shrinking of the ivory by the drying out of the water that had been absorbed in the damp spring weather of Chicago, and knowing that Dr. Wedelstaedt had in his office an arrangement for holding water constantly at the temperature of ninety-eight degrees Fahr., I wrote, asking him to prepare cavities in an ivory slab and place it in the water for one week, then remove it, dry the cavities as in filling teeth, fill them with amalgam, return it to the water for twenty-four hours more, then remove, dress down flat, and lay it away to dry, and note the results.

A photograph of this slab shows that the fillings have all assumed the rounded surface, and also that the margins have been extruded considerably above the margins of the cavities. This experiment was repeated a number of times with the same results, every filling, no matter of what amalgam, not only spheroiding, but its margins being extruded considerably above the general surface of the ivory. Careful measurements of the ivory when removed from the water, and again after drying, showed quite a large degree of shrinkage.

These experiments show two things very plainly. First, the inevitable confusion that must arise from experiments made with amalgam fillings in ivory, or in human teeth out of the mouth, without the most rigid following of hygrometric conditions. Second, the relation of the strength of ivory, or dentine, to the strength of amalgam. Either human dentine or ivory from the tusk of the elephant are strong enough to cause the strongest of the silver-tin amalgams to be moulded into any form when a slow, steady pressure is maintained. A block cut from human dentine may be pressed into a fully hardened amalgam filling in a cavity in ivory, or in a human tooth, causing the amalgam to well up around it and over the margin of the cavity like so much wax. This will not necessarily mar the sharp corners of the dentine block nor injure the walls of the cavity, indeed, the same block of dentine can be used for a number of such experiments. In view of these facts, it will be seen that the confusion that has appeared in this class of experimentation in the past was inevitable.

It is impracticable to fully present this subject in this paper, and thus far what may seem to be the dark side of the subject has occupied our attention. The blocks used for determining the flow of amalgam are without lateral support. Fillings in cavities are supported by the walls of the cavity. It is a fact, however, that a large proportion of the amalgam fillings made are placed in cavities so prepared that the surface on which the filling rests, *the seat of the filling*, is too small to support the stress which comes on the area of surface exposed to the stress of mastication; or the seats are so rounded that the readily yielding material allows the mass to be slowly tilted from side to side, or slightly moved. In either case the perfect margin is lost and the filling becomes leaky. Most dentists seem to have supposed that amalgam fillings were the easiest fillings to anchor safely, but as a

fact they are the most difficult. Cavities prepared to receive amalgam fillings should have a broad, flat seat at right angles with the direction of stress, and parallel side walls. The form of a box is the typical for a cavity for amalgam.

The Dental Cosmos.

SURGICAL PHOTOGRAPHY.

Modern photography has not taken the place that it deserves in surgical practice as an aid in the recording and registration of cases. Nowadays with dry plates and films of extreme rapidity; with ateliers everywhere where the mechanical parts of the process can be done; with electricity and flash lights which render skylights unnecessary, and make us independent of the sun; and with the expense incidental to the process reduced to a trifling sum, it is a marvel to us that a camera is not an adjunct to every operating room and surgical clinic. What verbal picture can reproduce a lesion a deformity, a tumour, like a photograph? What record in words can have the effect of a photograph before and after operation? What description can tell so much as accurately as does the sensitive plate? A photographic record, as it can now be made, would be invaluable to the surgeon for recording and keeping track of his cases, as well as for his more strictly scientific work.

It is perfectly possible to do so with an inexpensive camera and lens and a few plateholders. All the rest of the work, developing, printing, toning, and mounting, is now done so cheaply that it hardly pays the amateur, unless he desires to do the work, to undertake it himself. He focuses his camera and exposes his plate, and he obtains a record far more valuable than one in words could be, more especially since the personal equation is entirely eliminated from his description.

For the best kind of work, of course, elaborate apparatus and great technical skill is required; but ordinary photography any amateur can accomplish.

International Journal of Surgery.

TRAUMATICIN.

Traumaticin is a saturated solution of gutta-percha in chloroform; it is most advantageously prepared as follows:—The lightest-coloured gutta-percha procurable is cut into small pieces and macerated with 12 or 15 times its weight of pure chloroform for twenty-four hours, with frequent agitation. The mixture is then transferred to a retort, and about one-third of the chloroform distilled off over a water bath. The traumaticin thus obtained is a thick homogeneous liquid, to which the requisite medicament may be added. For ichthyol traumaticin 4 parts of ichthyol are added to every 10 parts—similar proportions are used for salol, lysol, and phenol. Corrosive sublimate is added in the proportion of 1 part of sublimate for 100 parts of simple traumaticin. If the simple traumaticin should be coloured, and a colourless medicament is to be added, it may be discoloured by means of animal charcoal. It is best applied with a brush of hog's bristles, and forms a thin impermeable, pliable pellicle when the chloroform dries off. It gives rise to no discomfort, except a sense of burning when first applied, due to the chloroform. Traumaticin of ichthyol is of special service in the case of erysipelas.

Bull. Gen. de Therap

EXPERIMENTAL ROOT FILLING.

By H. T. KING, D.D.S., Fremont, Neb.

At the recent meeting of the Nebraska State Dental Society, he exhibited sections of roots of a large number of teeth filled by different operators in the State. The teeth were sent out with ball of wax on end of each root and small cavity in wax opposite the foramen, the tooth set in plaster to conceal roots, and the request made to fill in usual manner and return without removing from plaster.

Of the teeth returned, but 25 per cent. had foramen

sealed, and to the unaided eye gave appearance of perfect root filling.

Twenty per cent. had filling passed through the foramen to form a small nodule of gutta-percha on end of root. These he classes as No. 2, for while gutta-percha may not do any harm if passed through the foramen, all operators would rather it should only go far enough to seal the opening.

In 42 per cent. of the teeth the operator failed to force the material used to the end of the root, the canals being from one-twelfth to one-fourth of an inch short of full. The other 13 per cent. had nerve broaches, tin or copper points or large masses of gutta-percha through the end or side of root in such a manner as to preclude all chances of success if in the mouth; but inasmuch as they were accidents that might not have occurred if there had been life at the end of the tooth instead of plaster, they were not taken into account in estimating whether dentists did fill the roots of teeth as perfectly as they talk about doing in society meetings or not.

When men boast of their ability in the direction of filling the roots of teeth in the mouth and hermetically sealing the foramen, it always seems to him that they are telling something that from the nature of the case they cannot know whether it is true or not, and with some teeth it is an accident if true. Our best efforts should be given in the attempt to fill all canals, but he thinks the investigation looking toward the best method of cleansing and thoroughly disinfecting the canals is much more important than mechanically filling the root if in an aseptic condition.

The Dental Review.

HABIT SPASM.

By Dr. OLIVER, Indianapolis.

Habit spasm, or preferably habit chorea, as produced by dental irritation, is a peculiar malady usually found affecting the muscles of the face and neck, more often observed in females than in males. It is noticed to be more liable to occur about the time of dentition, either at the eruption of the

deciduous teeth, during a period of time existing from six months to two years, or at the eruption of the permanent teeth from five to thirteen years, or at the eruption of the wisdom teeth from eighteen to thirty years, and in some rare cases at the eruption of a tooth of the third series very late in life. Of course, this reflex neurotic condition may be present from some pathological condition of a tooth at any time of life, but I think these cases are of infrequent occurrence, and when they are found, are usually caused from such dental irritation as pulp stones, or as exostosis, constricting or impinging the nerve fibres, in which cases after a correct diagnosis the cause must be removed, when nature will take care of itself, with possibly such assistance as local and systemic stimulation. Cases of this kind rarely last any great length of time, the involuntary twitching of the muscles ceasing after the peripheral irritation is removed, when the normal centrifugal action takes place almost simultaneously. The so-called teething spasms of babies usually subside after the tooth has forced itself through the alveolus and gum.

The fact of teething spasm being no more or less than a form of chorea is a much disputed question, but I feel satisfied in believing that such is the case. Who among us, that has witnessed the agonizing expression, the distorted face, accompanied by the involuntary jerking of the voluntary muscles of the face and neck of a baby, can deny that in addition to the slight remittent fever there is a reflex neurasthenic condition, a choraic spasm present? This condition happily disappears after the eruption and does not need extended therapeutical treatment.

In behalf of the cases presented caused by dental irritation during the eruption of the permanent teeth between the years of five and thirteen, I will say that these are probably the cases that last longer, are harder to combat, and cases where the old time practitioner must leave the rut in which he had been travelling so contentedly, and use his therapeutical knowledge diligently. If a child is affected with choraic movements, it will be found that in ninety per cent. of all cases which have been produced by dental irritation, to have commenced with the eruption of the sixth-year molar, and if there is a choraic tendency, that is, if he has inherited this pathological condition from his parents, or if his family history is of a phthisical, scrofulous, rickety or syphilitic character, then usually the habit spasm will continue with more or less

frequency until after the eruption of the second molar at about the thirteenth year, at which time there will be a lengthened cessation, until the wisdom tooth again starts the trouble. In these cases arsenic is the most valuable remedy. Fowler's solution can be given after meals, commencing with three drops three times a day, and increasing the dose from time to time until the child takes ten drops after each meal provided, however, that nausea, œdema of the eyelids, or other toxic effects of the drug do not appear. Iron, cod liver oil and quinine may be given in combination with arsenic, if the condition of the patient is anæmic, or if good results do not follow the use of arsenic alone. Certain precautions, however, should be exercised in reference to the child, by its parents and associates. Study should be interdicted, plenty of good food and fresh air should be provided, encouragement and praise should be freely bestowed as aids to the child in its attempts to conquer the choraic habit. Anything which disturbs and annoys the patient does harm. Such, for example, as mimicry, confinement to the house, deprivation from reasonable pleasure, or unnecessary crossness of a parent. Many a child has been scolded and even whipped for not ceasing to make faces when the action was entirely involuntary of the child's will.

Perhaps the most trying form of this disease is where it is produced by an arrest in the eruption of the wisdom teeth. Here is where the fine discrimination of diagnosis is necessary; especially is this true in the cases of young women. How frequently we hear of young women being dosed incessantly and even operated upon for so-called female weakness, when nothing in the world obtained but choraic spasm, perhaps produced from dental or ocular irritation.

One case occurred in my own practice, Miss D. being in the hands of the physician and treated for eighteen months for supposed uterine trouble, showing itself in reflex muscular spasms of the face, neck and shoulders. She was referred to me to have a rigid examination of her teeth made, after complaining of severe pain under the eye in the region of the left malar bone and in the left fauces. I finally discovered an impacted left superior wisdom tooth. After its removal under an anæsthetic, with a portion of the necrosed process, she grew rapidly better, the pains and spasms ceasing, and was enjoying her usual health in about three weeks.

As regards the choraic symptoms presented from the eruption of a tooth of the third set, one case of which I have seen, I will simply say that a removal of the cause, with possibly a general tonic for a few days, in combination with a local stimulation is all that is necessary.

The Ohio Dental Journal.

NOTE ON A RAPID METHOD OF STAINING FRESH TISSUES BY THE AID OF FORMALIN.

By THOMAS S. CULLEN, M.D.

The tissues hardened in this fluid are little, if at all, contracted. Accordingly the cells are in no way distorted, but stand out with great distinctness. While working with formalin specimens, it occurred to me that it might be of use in the preparation of frozen sections. The outcome was that we were able to make permanent specimens from the frozen sections in fifteen minutes, and that these specimens were fully as good as those hardened in alcohol for several weeks and then embedded in celloidin. Frozen sections, after being treated with formalin, are rapidly passed through 50 per cent., and absolute alcohol; they may then be stained in the same manner as any other hardened section would be. If, for example, we use hæmatoxylin, the process is as follows :

(a) Make frozen sections of the fresh tissue, freezing either with carbonic acid (as used by Professors Welch and Flexner) or with ether.

(b) Place in 5 per cent. aqueous solution of formalin for five minutes.

(c) Fifty per cent. alcohol two minutes.

(d) Absolute alcohol one minute.

(e) Pass through water.

(f) Stain in hæmatoxylin two minutes.

(g) Decolorize in acid alcohol.

(h) Wash in water.

(i) Counterstain in eosin twenty seconds.

(j) Pass through 95 per cent. alcohol, absolute alcohol, and then clear up in creosote or oil of cloves. Mount in Canada balsam.

Canadian Practitioner.

EUCALYPTOL AS A LUBRICANT.

Dr. C. N. JOHNSON, Chicago, Ill.

We have no pet hobby to advance, but use gutta-percha points as so often described. The lubricant employed in advance of the points is a solution of gutta-percha in eucalyptol instead of in chloroform. Eucalyptol is less irritating than chloroform, and the solution may be kept in a bottle with less evaporation. The criticism may be made that the failure to evaporate rapidly is an argument against the eucalyptol solution, but in a practical use of it this objection is invalid. A very small quantity is used, merely enough to lubricate the canal, and the cone of gutta-percha is pressed in it with gentle but prolonged pressure, till all excess is forced up alongside the cone, and is wiped out with a pledget of cotton.

In this connection it is well to state the necessity of using a warm instrument in pressing the cone to place, so that the gutta-percha is somewhat softened. All inequalities in the canal will be more perfectly filled in this way than with a cold cone. The use of the eucalyptol solution in this manner for several years has seemed to indicate that there is less likelihood of the temporary soreness so often complained of by operators who use chloro-percha. Chloroform is an irritant and the apical tissues surrounding some roots are so susceptible of irritation that the slightest disturbance, whether with medicines or instruments, is likely to cause trouble for several days, if not longer. It has been the rarest exception with me in recent years to have any complaint of soreness after root filling.

Southern Dental Journal.

OBITUARY.

The Dental School of Harvard University has sustained a serious loss in the death of the Dean, Dr. T. H. Chandler, which took place on August 27th. He had been professor of Mechanical Dentistry since 1872, and Dean of the School since 1874. His literary work consisted chiefly of papers for the different medical and dental journals; an exhaustive

article on "Thumbsucking in childhood and its results" was translated into all the European languages and obtained a European reputation for its author. Translations of two large works on dental caries, one by Leber & Rottenstein, and the other from the French of Magitot were the chief events of his literary career.

Review.

ALPHABETICAL DENTAL CATALOGUE.

Mr. Francis Lepper, of Great Marlborough Street, sends us a very complete catalogue of all the things a dentist may require, and some that we should imagine are seldom enquired for. For instance, we learn that the present price of "Tooth-keys, with spring bolt and 3 claws," is seven shillings and sixpence. Mr. Lepper claims in his Preface that this is the first alphabetical dental catalogue, published in England for the use of the Profession, and the cross references seem well arranged to aid the Dentist referring to any article he may require.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents]

To the Editor of the "British Journal of Dental Science."

HOSPITALS, MEDICAL AND DENTAL.

SIR.—Our Hospitals are responsible for a vast amount of *evil* in the way of furnishing the undeserving, and those who are quite able to pay for the services of a professional man, and the chemist for medicine. From my own observations and experience, I am firmly convinced that fully one half of those who receive gratuitous relief are quite able to pay for it, and in other cases have friends and relatives in affluent circumstances, whose duty it is to provide for the wants of their own flesh

and blood. The result of this is that in many cases the deserving poor are kept back, and have to suffer and die because the wards are filled, and the place they should have is occupied by one who does not require it. I have known cases where the patient donned an old suit of clothes and went in a cab. I have seen those who were quite able to walk, take a cab or tram. Only a short time ago the daughter of a patient came to me in a state of terror, with an upper molar which they broke at the hospital, and could not get the roots.

I am also certain that there are many who outpatients who should be out, and who for most trivial ailments linger to get free quarters. There is need for the most rigid inquiry into the means, position, and *bona fides* of each patient, as such imposition has most direful effects on young professional men, blasting their prospects of success, and in many cases the cause of utter ruin, and even death. I could from 40 years' practice tell many harrowing tales, and the competition in every line of business is so severe and great, that in the majority of cases, to succeed requires the most strenuous efforts, energy, tact, and push, or you must go to the wall, and you are left to become a hewer of wood and drawer of water for those who are in many cases your inferiors in skill and ability.

Trusting this most important matter may receive the earnest attention of those, in both professions, who are more able than I am to deal with it, and also with the quack outsiders who illegally practice on the public.

I am, yours sincerely,

AJAX.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
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British Journal of Dental Science.

No. 666. LONDON, OCT. 15, 1895. VOL. XXXVII.

NITROUS OXIDE ANÆSTHESIA.

By DUDLEY BUXTON, M.D., B.S.,

Member of the Royal College of Physicians; Anæsthetist
in University College Hospital, and the Dental Hospital
of London.

Concluded from page 875.

Paul Bert found by experiment that in one hundred volumes of blood examined at the stage of complete anæsthesia, there were 45 volumes of nitrous oxide. Of course this result does not help us to say whether the patient was deprived of the requisite quantity of oxygen. The results of Jolyet and Blanche however, throw light upon this point. Their experiments¹ were made on dogs, and in percentages the quantities of the normal gaseous constituents of the blood were given as

Carbonic dioxide	48.8
Oxygen	21
Nitrogen	2

and after inhaling a mixture of

Nitrous oxide	62 parts.
Oxygen	24 „
Nitrogen	17 „

¹ Archives de Physiologie, 1873.

for seven minutes and a half, the blood was found to contain

Nitrous oxide	29
Oxygen	19.7
Nitrogen	0.3
Carbonic dioxide	4.6

The mixture thus inhaled did not produce insensibility so that the results, although most interesting are not comparable with what occurs in nitrous oxide intoxication.

It is worthy of note that while the carbonic dioxide tension had fallen, owing in all probability to the lessened metabolism taking place, itself the result of the decreased oxygen supply, the nitrous oxide tension was a little under two thirds of what Bert found in his experiment. In Jolyet and Blanche's investigation the length of time they allowed to elapse before analysis, would have permitted of a certain physiological readjustment. To make their research complete they should have collected the expired air as well as the residual air in the lungs and submitted them to analysis.

They further made a dog inhale pure nitrous oxide for one and three quarter minutes, but produced no insensibility probably because they failed to exclude the ingress of air and to get rid of the products of expiration. The results were,

Nitrous oxide	28.1
Oxygen	5.2
Nitrogen	0.7
Carbonic dioxide	37

a second experiment continued for 3 minutes with some insensibility gave

Nitrous oxide	34.7
Oxygen	3.3
Nitrogen	
Carbonic dioxide	36.6

a third experiment giving insensibility after four minutes—

Nitrous oxide	37
Oxygen	0.05
Nitrogen	
Carbonic dioxide	34

The same fallacies intrude themselves in all these experiments. No sort of effort or at least no satisfactory effort was made to exclude purely asphyxial phenomena. The nitrous oxide tension was too low to produce anæsthesia before the effects of oxygen exhaustion had had time to make themselves evident. In the careful but incomplete research of Garrett² the following results were arrived at.

The norm (dog) gave on analysis

		Sanderson's Handbook to the		Meyer	Plüger
		Physiological Laboratory		(<i>From Halliburton.</i>)	
Carbonic Dioxide	...	39.5	...	26 to 34	34.3
Oxygen	...	17.65	...	12 to 18	22
Nitrogen	...	2.1	...	3 to 5	1.8

After nitrous oxide anæsthesia in the case of a rabbit :—

Nitrous Oxide	...	22.49
Oxygen	...	3.49
Nitrogen	...	11.23
Carbonic Dioxide	...	15.66

As noticed above, under nitrous oxide anæsthesia there appears to be a lessening of carbonic dioxide, in opposition to what was shown by Paul Bert and de St. Martin to obtain in the case of the other anæsthetics such as chloroform and ether. The writer of the present paper hazarded the theory in the research already mentioned that nitrous oxide while able to combine loosely with hæmoglobin, although Mac Munn

2 "An analysis of the gases of the Blood during Chloroform, Ether, bichloride of Methylene and nitrous oxide Anæsthesia," By Thomas Oliver, M.D., F.R.C.S., and F. C. Garrett, M.S., F.C.S. *The Lancet*, Sep. 9, 1893 p. 625 *et seq.*

and others failed to prove a distinctive spectrum, yet also passed into solution and became associated with the albuminous constituents of the blood. The very careful work of Dr. Pickering corroborated this view so that it would seem that unlike chloroform, carbonic oxide and some other bodies, nitrous oxide is capable of becoming associated with hæmoglobin without destroying the power that body possesses of taking up and parting with oxygen. This is a point of extreme importance to us in the present consideration.

Oliver and Garrett's experiment made upon the rabbit needs two comments. Firstly, it has to be borne in mind in accepting their figures that the rabbit's blood normally contains less oxygen than that of other mammals, and secondly, that as four minutes were allowed to elapse before the blood was analysed, some asphyxial phenomena must have been developed.

The remark which these observers make is worth noting.³ They say "Anæsthesia by nitrous oxide seemed to be extremely rapidly induced.....The analysis of the gases of the blood in nitrous oxide (narcosis) shows a most marked deficiency of oxygen but no excess of carbonic dioxide ; nitrous oxide and nitrogen are present in considerable quantity. So far as nitrous oxide is concerned the danger probably depends upon the great absence of oxygen, for it will be observed that the carbonic acid is present in small quantity as compared with that in the other anæsthetics : but it is present in very large quantity relatively to the amount of oxygen associated with it in the blood." In other words, the danger of nitrous oxide narcosis is that of the concomitant asphyxia, which as we hope to show, is in point of fact, in no way a necessary or desirable part of the usual administration of that gas.

3 Op. Cit.

It cannot be too clearly understood that to obtain anæsthesia from nitrous oxide at all, each given individual needs what may be called his or her physiological dose. The presence or absence of oxygen probably has very little to do with the matter save mechanically. If it were possible to give the requisite dose of nitrous oxide and at the same time to maintain in the blood the physiological standard of oxygen, anæsthesia would result. This has been shown to be so where the gases are given under pressure by Paul Bert's method. The same thing has also been shown when the mixture is given under normal pressure. All asphyxial symptoms, by admitting the requisite quantity of air or oxygen can be avoided and the patient can be rendered anæsthetic for indefinite periods.

Bert employed with success both mixtures of air and nitrous oxide, and of oxygen with nitrous oxide and obtained anæsthesia with them at normal pressures. The contention of Oliver and Garrett that nitrous oxide is dangerous owing to the extreme lowering of the oxygen tension in the blood, is also affirmed by M. Laffont⁴ who formally renounces nitrous oxide and all its works as being always dangerous, and more especially so in (1) pregnancy, (2) at the menstrual epoch, (3) in persons the subject of nervous disorders (4) in diabetes. His conclusions are based upon certain experiences which although too disproportionately trifling when compared to the enormous number of persons who have taken nitrous oxide with perfect impunity are yet interesting in themselves and carefully reasoned upon by M. Laffont. The following is an epitome of his cases.

(1) Female æt. 35, pregnant 18 weeks, very nervous. Nitrous oxide given by dentist, patient did not go under easily. Cyanosis appeared in $1\frac{1}{2}$ minutes and the tooth was

⁴ "Contre indications aux Inhalations de Protoxyde d'Azote pur" *Compte rendus hebdomadaires des Sciences de la Société de Biologie*. Dec. 4, 1885.

removed. No pain was felt. On becoming conscious she appeared stupified and complained of headache. A year later the husband stated the lady had been ill, having nervous symptoms vomiting and anorexia and aborted after 6 weeks. The foetus it was believed had died about the same time that the mother had been put under nitrous oxide. She had not had a miscarriage before.

The report of this case shows that the narcosis was complicated with asphyxia as M. Laffont admits although he appears to believe such a complication constitutes an inevitable result of nitrous oxide administration.

(2). Female, æt. 14½ had been menstruating regularly for five months. She was given gas, became unconscious very rapidly and very much cyanosed. The teeth were extracted without pain but the cyanosis remained until she recovered consciousness. This patient developed hysterical symptoms, afterwards grew pale and missed her next period. It was feared she was becoming chlorotic. Here again we have an instance of asphyxia.

(3) Male, aged 19, a student, with history of some nervous disorder in childhood. After inhaling ten respirations breathing ceased. Artificial respiration was performed, the patient resumed consciousness, but went off into an epileptic fit. The operation was not performed and indeed was put off indefinitely as epileptic seizures recurred at the same hour each day, the hour being the one when the gas had been administered.

Such seizures in the epileptic although rare have been noticed. Dr. Savage has recorded instances in which attacks of various forms of madness have followed the performance of operations under anæsthetics and there seems little reason to doubt that the disturbance whether psychic or arising from the anæsthetic must so interfere with the cerebral circulation as to cause grave nervous troubles in those predisposed

to such nerve storms. It has happened to the writer to administer nitrous oxide gas both to epileptics and to the insane but on no occasion has any exacerbation of the nervous trouble followed. In the case given by M. Laffont the paralysis of the respiratory centre would at once generate the asphyxial symptoms which we have striven to show are in fact the dominant cause of the various ill effects imputed to nitrous oxide.

4. A male diabetic, a patient of M. Laffont, on two separate occasions had nitrous oxide gas, and on each occasion this was immediately followed by a recrudescence of his symptoms—severe thirst, and increased eliminations of sugar. On a subsequent occasion, at the instance of M. Laffont, the tooth extraction was performed without gas being given, and no diabetic symptoms followed.

5. Male adult with mitral incompetence causing dyspnœa, developed anasarca and albuminuria followed by pulmonary obstruction, immediately upon taking nitrous oxide gas.

M. Laffont very rightly associates these cases with asphyxia, and quotes Dastre, who has shown that oxygen deprivation is itself enough to produce glycosuria. It is probable, if not certain that had the pathological sequelæ described in the five cases quoted been causally related with the administration of the gas, they would not have occurred if due care had been exercised to exclude the wholly unnecessary development of asphyxial phenomena. Dr. Robert Bowles⁵ has pointed out the close relation which subsists between suffocative symptoms and the most grave nervous lesions.

In the course of a most interesting research Dr. George Oliver⁶ made upon the various calibres of arteries in different pathological conditions, and when the patient was placed under anæsthetics, he demonstrated most conclusively that while under nitrous oxide gas, if asphyxial

⁵ Stertor and Apoplexy, 1891.

⁶ "Pulse Gauging," by George Oliver, M.D., 1895.

symptoms were allowed to appear, the artery contracted very notably, yet when that agent was administered without such complications, little or no contraction took place, and the result was comparable to the initial stimulation caused by all anæsthetics. In other words the records obtained from anæsthetised persons who are not suffocated differ widely from those which follow where deprivation of oxygen is permitted to reach a degree amounting to asphyxia.

The deaths which have occurred when nitrous oxide gas had been given are sufficiently few to be almost excluded in reckoning the rate of mortality under the agent, but as several of them are carefully recorded, it will be useful to take them here seriatim, and attempt to trace in each case the true cause of death.

1. Case of Mr. Sears⁷. Although "to all appearance in perfect health" he was in the last stage of consumption. He after taking the gas resumed consciousness, being apparently one the worse; in a few moments, however, he became short of breath, and lying down on the sofa died. The verdict was that death was due to "congestion of the lungs caused by taking nitrous oxide gas," an impossibility, of course, seeing that the congestion could hardly have arisen in a few moments.

2. ⁸A robust young woman inhaled gas, not however to insensibility. The gas was given by a "travelling dentist" at a public exhibition, at Swanton Falls, and several persons took it. The girl fell ill on the following day, and died on the next day. No evidence is adduced to show the cause of death.

3. ⁹A lady living in Allentown, Pennsylvania, took gas, which "a few hours afterwards placed her in her grave."

7. *Dental Cosmos*, 1884, p. 456. See also *New York Tribune*, Jan. 13, 1864.

8. *Dental Cosmos*, 1864, p. 456. Also *New York Tribune*, Feb. 18, 1864.

9. *New York Tribune*, Feb. 26, 1864.

4. Dr. Kidd¹⁰ reports, "A death has just occurred in a dentist's chair; it was that of a fine young woman in perfect health, who was induced to take this anæsthetic rather than chloroform."

5. ¹¹Male, aged 13, took gas, and as the tooth was extracted, it, together with the cork which was used as a mouth prop slipped into the mouth. The tooth entered the stomach, and was vomited up, the cork entered the larynx, and was removed post mortem. The patient died suffocated.

6. ¹²A middle-aged woman took gas for extraction of some front (loose) teeth. She took a little gas three several times, being very nervous both of the gas and of the operation. Finally she decided to have the teeth out without an anæsthetic. She fainted as the teeth were taken out and never rallied. A jury composed of medical men found death was due to the use of the gas, and censured the unfortunate administrator!

The Lancet ¹³commenting upon this case says "The nitrous oxide can have had no more to do with the fatal issue, either directly or indirectly, than if it had never been brought into the room." Unfortunately the dentist made a point of holding the fainting woman in the erect posture to "determine the blood downward," and of course the result was not far to seek.

7. ¹⁴A patient died under influence of nitrous oxide, at Chicago, October, 1871, just before the great fire. No particulars were obtained.

8. ¹⁵Mr. Browne Mason's case:—

10. *Medical Times and Gazette*, 1864, p. 301.

11. *Medical Surgical Reporter*, Philadelphia, Feb. 2, 1867.

12. *Dental Cosmos*, vol. xiv., p. 311.

13. *Lancet*, May 26, 1872, p. 727.

14. Lyman's Artificial Anæsthesia, p. 324.

15. See *Transactions of Odontological Society*, 1873; *British Journal of Dental Science*, vol. xvi. p. 126; and *Lancet*, Feb. 1st, 1873.

Female, aged 32, healthy. After six respirations the pulse was slower, but unaltered in volume. The crown of a diseased tooth was cut off. The patient resumed consciousness, but was again given gas after an interval of ten minutes to complete the operation. Just before losing consciousness a second time the patient put up her hand and pushed away the inhaler, which however, was replaced. The operation was performed successfully, and occupied 45 seconds. The patient's face was seen to be cyanosed. The symptoms grew more alarming, stertor appeared, the face became bloated and the eye-balls prominent. The pulse beat for two minutes after respiration failed. No necropsy was made. Dr. Drake gave it as his opinion that the cause of death was paralysis of the respiratory centres, caused by inhalation of the nitrous oxide.

Compare the case of Mr. Minett, (No. 15), given below, in which no doubt the same mechanism was at work.

The comments made by the *Lancet*¹¹ upon this case are fair enough in the light of the knowledge which was possessed at that time of the action of the gas, but are not now to be recognised. It was believed then that nitrous oxide gas was an asphyxiant, and the fact that the pulse rate varied was taken as a conclusive proof that the heart was affected by nitrous oxide, and by implication prejudicially affected. There can be no doubt that in this case the anæsthetic was pushed to an undesirable extent, and was given by the same person who undertook the operation. This no doubt was unavoidable, but none the less was it undesirable. The exclusion of air for a period long enough to allow of narcotising of the respiratory centres must be fraught with peril and is in the light of our present knowledge quite unnecessary. In the hands of Mr. Browne Mason it cannot be doubted that every thing which experience and the knowledge which was possessed at that period was done, but the contention of the

12. *Lancet*, Feb. 1, 1873, p. 179.

the writer of this paper is that with our present information such a case could not occur in the hands of so accomplished a member of the dental profession.

9. The case of Mr. Harrison.¹³

The patient was a medical man, aged 53, nervous and exhausted from insufficient food. He had suffered much from bad teeth and could not take his proper nourishment. The dentist, a neighbour, allowed Mr. Harrison to hold the face-piece himself. He respired vigorously. The first attempt at extraction was made before he was fully insensible; he begged for more gas, this was given, and another attempt at extraction was made, but he appears never to have been completely under the influence of nitrous oxide. He suddenly became *in extremis* and died.

Mr. Clover commenting upon this death said, "the most probable explanation of this sad case is, that the extractions were difficult, and that the patient on recovering from the effect of the gas was susceptible to the shock of a severe operation; and that this shock and not the gas was the cause of the syncope, which structural disease of the heart rendered fatal." It appears that no third person was present, and that the remedial measures were not adopted until medical help had arrived, the *post mortem* appearances revealed dark fluid blood between the scalp and periosteum, and adherent *dura mater*, serous fluid in the membranes, intense venous congestion, the lungs full of dark blood, arteries and liver much diseased. In this case, as Mr. Clover has pointed out, the death resulted from mismanagement and insufficient gas, and could hardly have occurred in the hands of an experienced anæsthetist. It certainly does not advance one tittle the contention of those who affirm that nitrous oxide is *per se* in every case a danger to life.

13. See *Times and Gazette*, April 28, 1877; *Lancet*, 1877, vol. i., p. 544; *British Medical Journal*, 1877.

10. ¹⁴Patient, a man of 57, with cancerous enlargement of his tongue, that organ being firmly fixed. Glands on both sides were enlarged, hard and fixed. He was given gas by the house-surgeon at the Dental Hospital of London, he became unconscious in about 30 seconds. When the operation was about to be commenced, he became breathless and died. He appeared to have been in a terribly shattered condition at the time of the operation, and died from exhaustion. Some teeth had been extracted a week before, not under gas, without untoward results. The cause of death was said to be syncope.

11. ¹⁵M. Lejeune, a magistrate, was given nitrous oxide by M. Duchesue, a dentist, the operation was performed, and the patient was discovered to be dead, he died presumably before the tooth was touched, as no hæmorrhage followed the extraction. The death was caused by syncope, the result of fear, on the shock of the operation. No third person was present.

This case appears, as far as one can judge by the very meagre evidence, to fall into the category of shock-syncope possibly associated with, but hardly caused by, the administration of the anæsthetic. The dentist was severely censured for giving the gas, and further mulcted in damages.

12. ¹⁶The case of Lady Milne.

The patient was 71 years of age, a very nervous woman, suffering from intense fear of the operation, and repeatedly said she would die under the anæsthetic. She breakfasted heartily at nine, and the gas was taken at twelve, but the *post mortem* examination showed the stomach was full of

14. *British Medical Journal*, April 13, '1883; *British Journal of Dental Science*, vol. 26, p. 929.

15. *Le Profes Dentaire*, Decembre, 1885; *British Journal Dental Science*, vol. 28, p. 164.

16. *Lancet*, 1889, vol. ii., pp. 712, 750, 804; also *Journal of British Dental Association*, vol. x. p. 689.

food at the time of the operation. Lady Milne was the subject of marked fatty disease of the heart. She was very tightly laced, indeed so much so as to impede respiration and circulation. When nitrous oxide was given the breathing was very shallow, and the dentist urged deeper breaths. When she became unconscious two teeth were removed, and the antrum opened, a good quantity of pus escaping. She then became livid, the pulse and respiration stopped, and she died. She was in the sitting posture. It is doubtless true "that Lady Milne died from mechanical, rather than poisonous agency."

¹⁷The dentist in recording this case makes use of the phrase "I continued the inhalation until I judged she was fully anæsthetised." He then operated, whether the anæsthesia was sufficiently prolonged to allow of two teeth coming out, and the opening of the antrum, we cannot of course say, but it seems not unlikely that the operation shock may have been in part transmitted by a semi-anæsthetic zone of nervous connections, and a reflex inhibition of the heart have resulted. Certainly such an inhibition would in the case of a person with extensive heart disease prove fatal.

13. ¹⁸Male, aged 24, gas given by the dentist (in Montreal). As soon as the tooth was extracted the patient gave a gasp, and fell out of the chair dead. The patient had had no food for five hours, and was stated to be free from heart and lung disease. The gas was pure. The death was attributed to shock from incomplete anæsthesia. The evidence is not sufficient to arrive at an exact conclusion in this case, but what evidence there is strongly points to the patient having died from incomplete anæsthesia, causing shock and fatal syncope. Another instance of no third person being present.

17. *British Medical Journal*, 1889, vol. ii., p. 888.

18. *British Medical Journal*, 1890, vol. ii., p. 489. *Journal British Dental Association*, vol. xi., p. 434.

14. ¹⁹The patient, says Dr. Thomas, of Philadelphia, had repeatedly taken gas with impunity. On the occasion of his death he took the anæsthetic well, recovered, rinsed out his mouth, chatted to the operator, and after about twenty minutes complained of numbness of his fingers (right hand). He lay down, speech was rapidly lost, and hemiplegia appeared. In ten minutes further he lost consciousness, and in four and a half hours died. "The cause of death was apoplexy, and not from the effects of the gas."

Referring to this case, Dr. Wood says, "It is entirely conceivable that in a man of atheromatous, or otherwise diseased arteries, the inhalation of the gas might cause a rise of arterial pressure which should produce rupture of smaller or larger vessels, and cause serious symptoms."

²⁰This is true enough, but in the present case the interval which elapsed before the apoplexy disclosed itself, renders it at least unlikely that the nitrous oxide inhalation played any important part as a factor in bringing about the fatal result.

15. ²¹The patient, himself a dentist, aged 40, had apparently inhaled nitrous oxide gas while alone in his room, and died asphyxiated. Dr. Gage Brown found the body livid, the face, nails, etc., blue. He had been found seated with the face-piece of his gas apparatus applied to his face, his head had fallen forward on his knees. The gas cylinder was then empty, and the screw tap turned on. The unfortunate man after turning on the gas must have become unconscious and fallen forward in such a posture that the mask remained over his face, and thus his respiratory centre must in time have become narcotised, and he suffocated. The necropsy revealed morbid changes consonant with this view. Dr. Gage Brown

19. *Journal of British Dental Association*, vol. xii., p. 31, in which is quoted *The Dominion Dental Journal*

20. "A Research on the action of Nitrous Oxide on the Circulation," p. 12.

21. *Lancet*, 1893, vol. i., p. 1319.

expressed his opinion that but little gas was inhaled, but that owing to the tight fitting face-piece, all air was excluded, and the unfortunate man had been mechanically asphyxiated. Whichever view we may adopt, the death is one which could not occur when the gas was given by an experienced administrator.

16. ²²A patient, a young man, had partaken of lunch an hour before. He walked into a city dentist's room, and asked to have gas given to have a tooth removed. Mr. John Adams, F.R.C.S., who stated he had experience of over 40,000 administrations, gave the anæsthetic. After three or four breaths, the patient pushed the mask aside and said he felt nervous. He however, requested Mr. Adams to give him more. This was done. The breathing was shallow, but regular. The tooth was taken out after two-thirds of the usual quantity of gas had been given. The respirations then at once became irregular, and the patient became cyanosed, the muscles grew rigid, and after two or three breaths the respirations ceased. The patient was placed on the floor, and artificial respiration commenced within thirty seconds of the extraction. The heart was still beating. The man had a short thick neck and receding lower jaw. Tracheotomy was performed, and about an ounce of mucus was forced out of the trachea. Cyanosis deepened and in spite of artificial respiration the man died. The necropsy showed the veins were all full of dark black blood. The lungs were nearly airless, a quantity of thick mucus was found in the bronchi. The organs were healthy. Mr. Adams says "the patient died from asphyxia."

The mucus was regarded as obstructing respiration to such an extent as to practically suffocate the patient, while it was thought some peculiar "idiosyncrasy" of the patient, made his larynx and bronchi so insensitive as to prevent the usual

coughing, which under normal conditions would expel the obstruction. This case certainly offers difficulties. It is clearly one of asphyxia, but why a young and apparently healthy man should succumb in this way when nitrous oxide was properly given, is a mystery. That the anæsthetic was carefully and efficiently given by Mr. Adams, a man of more than usual experience we cannot doubt. The narrative also informs us that the apparatus employed allowed about 2 per cent. air to mingle with the gas. Also the same gas and the same apparatus was used both before and after the death for other patients without any accidents occurring. Mr. Adams falls back upon idiosyncrasy, but even were such a vague expression any assistance, it is extremely doubtful whether one is justified in believing that out of the many millions of persons who have now taken nitrous oxide gas without evincing any idiosyncrasy, one and one only, should reveal an idiosyncrasy. Probably in the anatomical peculiarity of the man's build, the short neck and receding chin, coupled with the water logged state of his chest, the true solution of the mystery is to be sought. No doubt had it been known that the patient was choked with mucus, the [anæsthetic would have been deferred. It is evident to all who are familiar with the great difficulty which always arises when anæsthetics are given to persons with short thick necks and receding chins, that it is very easy for the tongue to fall back and occlude the laryngeal chink. Mr. Adams asks would it have been wise to have opened the larynx at once especially as the operation of tracheotomy proved difficult owing to the anatomical features to which reference has been made.

16. ²³ A servant maid had gas given her by a dentist in his rooms, and on resuming consciousness passed into a syn-

23. Lancet, 1895, vol. ix. 168.

cope which proved fatal. It was found that the young woman was very tightly laced. It is said her corsets were five inches too small for her. This is a case of death due to a perilous disregard of the laws of physiology and only indirectly due to nitrous oxide gas.

The study of these sixteen cases shows firstly, that not more than three can be attributed directly to the anæsthetic. This represents so infinitesimal a death rate as to practically make gas free from danger. Of these three cases two—the deaths in Nos. 8 and 15—were due to asphyxia, and arose from paralysis of the respiratory centres—a form of death which must be very rare when the Adams' case death anæsthetic is given by those well versed in its use. In Mr. was no doubt also due to asphyxia.

In cases 6, 11, and 14 death did not arise from the use of nitrous oxide. The patients were not under gas at the time of death and it seems probable that although associated with the alarm and perturbation inherent to even minor operations, the deaths were due to natural causes.

Cases 1 and 10 were instances of persons suffering from exhausting diseases—and it would seem very ill indeed—being operated upon under an anæsthetic without very special precautions being taken.

Again, in the case of Lady Milne, (Case 12) nitrous oxide was one, and probably the least active, cause of death.

Incomplete anæsthesia with the shock inherent in that condition are noticed as determining causes of death in cases 9, 12, 13 and possibly 1 and 6.

The records in cases 3, 4, 7 and 9 are so imperfect that it is impossible to reason upon them.

Case 2 is one of incorrect administration and impure gas.

There thus seems convincing evidence that of the deaths really associated with nitrous oxide all those in which death can be imputed to that agent, the fatality arose from suffocation

Dr. Hasbrouck who possesses very large experience in gas giving, is quoted by Dr. Litch ²⁴ in an able article, as saying: "In the past sixteen years (1871-87) I have administered nitrous oxide to over fifty-two thousand people. I have kept some under its influence (profoundly anæsthetised) one hour and a quarter, many others from twenty to forty minutes. As far as I know there have been no fatal cases. There have been dangerous symptoms, but they were all in persons who had been afflicted with lung inflammations followed by pleuritic adhesions. In the cases referred to there seemed to be paralysis of the respiratory muscles, and entire inability to expand the chest." (See cases No.3, 15, 16.) In such cases my practice has been to place the patients much lower than the feet, and keep up artificial respiration. I have had from four to six patients, who, I think, would have died had they not been promptly treated in this way." The writer of the paper has met with one case similar to those quoted by Dr. Hasbrouck. The patient, a delicate boy, aged 9, was placed on his left side while a nævoid growth was treated with a galvano-cautery. The inhalation was intermittent and lasted about fifteen minutes. The child who took gas well, had gas, then some air, then gas again, and so on. During the inhalation respiration stopped, and no attempt at chest or abdominal movement occurred. There was absolutely no obstruction to entrance of air. A few compressions of the chest walls, restored natural breathing, and no further trouble occurred.

In the *Lancet*²⁵ the following cases are given, in which alarming symptoms occurred:—

"1. Female, age 30. Extraction of tooth. After a few inspirations became unconscious; pulse ceased: breathing

24. Anæsthesia and Anæsthetics. *American System of Dentistry*, vol. iii, p. 194.

25. 1893, vol. i, p. 1484.

stopped. Pulling forward tongue ; artificial respiration ; breathing at length became normal."

"2. Female, adult. Extraction of tooth. Acute and convulsive movement, during narcotism, but recovered. Walked 400 yards to station and was in train when seized with faintness, pallor, and active convulsion. Was put to bed unconscious. Next day insensible, pupils widely dilated, pulse irregular and weak, breathing feeble. Was sometimes convulsed. Breath with peculiar foetor ; odour of sulphur alcohol. Was treated as for hysteria ; recovery not perfect for several weeks."

3. Female. Removal of two molar teeth. Dentist who operated gave the gas. Respiration failed first. Administrator noticed that patient (a little girl) was not breathing. Artificial respiration, was employed and was successful in bringing patient round. At the critical moment, administrator was too much occupied in operation to notice sudden stoppage of respiration. He thought that had he been operating unassisted, he would certainly have lost his patient."

In this third case the symptoms were those of narcotism of the respiratory centre through overdosage with gas. The second case was probably due to action of the gas upon the unstable nervous system of a neurotic woman. This is a very similar case to the one cited by M. Laffont; and given above on Case 2, p. 918,

Summing up the evidence given, firstly by physiological research, secondly, by clinical experience, it is contended that dangers which arise from nitrous oxide are very seldom met with, and when they do occur are in every case due either to an antecedent pathological condition which rendered it very inadvisable to give the gas by itself; or to respiratory difficulties. Of these respiratory difficulties practically all arose from the intercurrent asphyxia which was allowed to complicate the true physiological action of the gas. If, as is

submitted, nitrous oxide can be given without any cyanosis or inaction (clonic or tonic spasm) or other sign of oxygen starvation, it may be employed with safety and convenience for practically all persons and all ages.

To effect this it becomes necessary to adopt a procedure somewhat different from what was formerly taught in the text books and practised by most persons. In the present paper it is not possible to enter into the *technique* of such more modern and rational methods, but it may be stated briefly that the principles which underlie them are that oxygen be admitted from time to time to the patient. This may be done either (1) by allowing oxygen to be mixed with nitrous oxide and the mixture inhaled, or (2) by permitting oxygen to be respired from a separate supply bag from time to time, as the exigency of the case may require, or (3) nitrous oxide may be given pure and at various stages of the inhalation air may be admitted, (4) or even a mixture of air and nitrous oxide may be respired.

These are, speaking broadly, the plans which should be pursued—not to counteract any asphyxial properties of nitrous oxide but to permit that agent to act for a prolonged period upon the central nervous system while all intercurrent asphyxial phenomena are absolutely eliminated.

The adoption of these means is of importance in dealing with persons who are free from disease, but is still more imperative in the case of those who are afflicted by deviations from the normal affecting their breathing mechanism or their hæmopoietic powers.

It is not denied that a mixture narcosis of air or oxygen and nitrous oxide is less simple to manage, and possibly requires more skill to bring to a successful termination, but certainly the important aid it renders us in dealing with dangerous and difficult cases outweighs any disadvantages it may possess in that respect.

Nitrous oxide will never fall into disuetude among those who know how to employ it properly, and whatever innovations may be introduced into our methods of exhibiting it, they will, if based upon sound reasoning, only confirm us in its use, and enable us to get a better and a safer anæsthesia from the employment of nitrous oxide.

ORAL SURGERY.

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Eng.

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(Continued from page 889.)

EXANTHEMATOUS NECROSIS.

Necrosis of the jaws is one of the numerous *sequelæ* which may occur during convalescence from the eruptive fevers. It is commonest after scarlet fever, but occurs also after measles, small pox and typhoid. It is most often met with in children of about five, an age at which developmental changes in the teeth are actively proceeding. The necrosis does not commence until some weeks have elapsed since the subsidence of the fever, and the extent of the necrosis bears no relation to the severity of the original disease ; very often the patient appears to be in good health.

Symptoms. The onset of the disease is insidious ; there are no active inflammatory symptoms and pain is usually slight or absent ; foetid breath is usually the first symptom that directs attention to the mouth. On inspection it is then

seen that the gum is red and tumid and more or less stripped up leaving the subjacent alveolus bare, and that from beneath the gum foetid pus exudes. As a rule the necrosis is limited to the alveolus and is symmetrical, that is to say it affects the same parts on both sides of the jaw either simultaneously or in rapid succession ; but this is not always so, the sequestrum depicted in Fig. 21 involves the whole depth of the jaw,

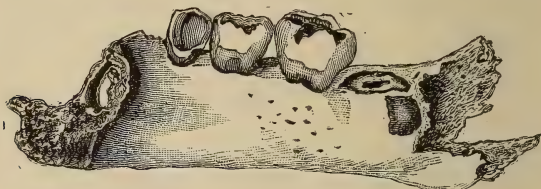


Fig.21.—Necrosis after Small Pox.
(From the Museum of St. Mary's Hospital.)

and affects only one side ; it was removed from a little girl of five convalescent from small pox.

The Treatment presents no peculiarity.

“ACUTE NECROSIS” (INFECTIVE PANOSTEITIS).

This disease which is probably the effect of a specific micro-organism in the blood, is most commonly seen in the tibia, but sometimes affects the jaws. It has been described by Senftleben under the name of “acute rheumatic periostitis.” It may occur in healthy persons with sound teeth after exposure to cold. It is accompanied by violent pain, great swelling of the affected part and intense fever. The most important point in the treatment is to make free incisions into the swollen part whether suppuration has occurred or not.

SYPHILITIC NECROSIS.

Affections of bones in secondary syphilis are usually slight and transitory, but in the tertiary stage inflammation of bone and periosteum is apt to produce necrosis. The lower jaw

is but rarely affected. It is in the palatine process of the superior maxilla that syphilitic necrosis is so often met with. In some cases the sequestrum does not involve the whole thickness of the bone, and no perforation of the palate results ; in other cases a small perforation occurs, but closes again when the sequestrum has come away ; in more severe cases a permanent perforation of the palate results, causing marked impairment of speech ; occasionally a large sequestrum from the hard palate may be discharged through the nose without the muco-periosteum of the mouth having been damaged.

Treatment. Iodide of potassium must be administered until the sequestrum has come away and all inflammatory trouble has ceased. With this drug, tonics such as quinine and cinchona may be advantageously combined. The mouth must be kept clean with antiseptic washes. Should a perforation of the palate occur, it should be covered over by a well-fitting obturator attached to the teeth ; on no account should the opening be plugged, as the constant pressure thus exercised would enlarge the aperture by causing absorption of the surrounding bone. The museum of St. Bartholomew's Hospital contains a curious specimen illustrating this point. It is the skull of an old woman who had lost the whole of her hard palate. She had filled in the gap with a bung of cork, around which was wound a quantity of tape to adapt the plug to the increasing size of the aperture.

In some cases where the aperture is small and the general health good, the parts may be successfully restored by a plastic operation.

STRUMOUS NECROSIS.

Strumous inflammation of the jaws is not common, but one sometimes sees cases of chronic osteitis and periostitis of the jaws, (most often the mandible) in young strumous subjects in which extensive caries and necrosis results.

The treatment consists in improving the general health by tonics, sea air, etc., and in scraping away all the carious bone and diseased periosteum.

IDIOPATHIC NECROSIS.

Lastly, it is necessary to mention that cases of necrosis of the jaws are sometimes met with, to which it is impossible to assign a cause ; they are called "idiopathic." Their treatment must be conducted on general principles.

EMPYEMA OF THE MAXILLARY ANTRUM.

This disease may result from blows on the face with or without fracture of the maxilla, operations involving the antrum, the presence of foreign bodies in the cavity, and the occurrence of necrosis of its bony wall ; but in the great majority of cases empyema is secondary either to *nasal* or *dental* disease. Authorities differ as to the relative frequency of these two chief causes ; dental surgeons see more cases arising from dental than from nasal diseases, but with specialists in diseases of the throat and nose this experience seems to be reversed.

With regard to the causal connection between antral and nasal disease our knowledge is not at present very definite. It is well known that the mucous lining of the antrum is anatomically continuous with that of the nose and that therefore inflammatory affections starting in the latter may spread by continuity to the former. It is probable that acute nasal catarrh may spread to and involve the antrum, but our present means of diagnosis do not enable us to recognise an inflammatory condition of the antrum which has not gone beyond the catarrhal stage. Chronic hypertrophic conditions of the nasal mucous membrane especially in the region of the middle meatus are often found to be associated with similar conditions of the antral lining, and so-called mucous polypi which

are now regarded by most authorities as being of inflammatory origin, are not unfrequently found coexisting in the middle meatus and in the antrum. In some cases nasal polypi seem to be the result of the irritation produced by pus flowing from the antrum, and in others, according to some, antral trouble is secondary to and dependent upon the presence of polypi in the region of the ostium maxillare.

With regard to the dental causes of empyema antri our knowledge is more definite. We know that the roots of the first and second molar teeth often form prominences in the floor of the antrum and are only separated from the mucous lining by a very thin plate of bone ; in the case of the first molar even this thin bony covering is sometimes absent, so that an abscess occurring at the apex of one of the roots would open into the antrum more readily than elsewhere.

Sometimes an alveolar abscess in connection with a canine or incisor tooth may open into the antrum although the roots of these teeth are not usually in relation with this cavity,

Clinically, cases of empyema antri may be subdivided into two classes which differ greatly in the symptoms manifested. In the first variety the ostium maxillare is patent, and the patient's complaint is of a discharge from the nose ; in the second variety the ostium is blocked and the complaint is swelling of the face.

EMPYEMA WITH PATENT OSTIUM MAXILLARE.

The discharge from the nose is nearly always from one side only, but sometimes both antra are affected and the discharge is bilateral ; it is intermittent, coming away when the patient's head is placed in any position which puts the ostium maxillare below the level of the fluid in the antrum, thus in the recumbent position, especially when lying on the side opposite to the affected antrum, the pus trickles down the throat and is swallowed or expectorated ; in the erect position pus flows

from the nostril on inclining the head forwards and towards the healthy side. It is often stated as a diagnostic point that if pus appear in the middle meatus, after the cleansing of the nose, on the patient going on his hands and knees and hanging his head down and inclined away from the affected side, the source of the discharge must be the antrum ; but it must be remembered that the same phenomena may be produced in cases of empyema of the frontal sinus. The discharge has a peculiar odour often compared to that of bad fish ; the smell is perceived by the patient but not by those around him. The constant swallowing of decomposing pus is very apt to upset the digestive functions and may seriously impair the general health.

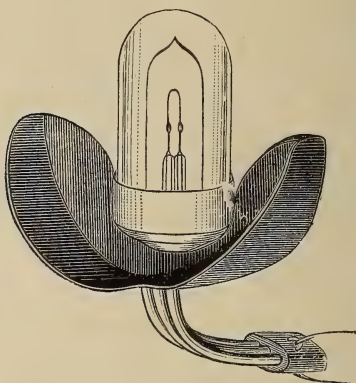


Fig 22.—Stevenson's Oral Lamp.

Pain is usually absent or so slight as to be of no importance. Swelling of the face does not occur unless it is due to some other cause.

The following methods of examination may be used to complete the diagnosis.

(a) *Catheterisation of the Ostium Maxillare.* It is possible to pass a hollow instrument into the antrum through

the ostium and to draw off pus, but the method of examination has not been found to be of any practical value.

(b) *Percussion* over the maxilla may yield a difference of resonance on the two sides, but the size of the air chamber is insufficient to give a percussion note of any real diagnostic value.

(c) *Transillumination* is of considerable value. An electric lamp such as the one depicted in fig. 22 is introduced into the patient's mouth. The room must be quite dark. When the oral lamp is turned on, the cheeks and lower eyelids become illuminated; sometimes the pupils are illuminated and look dullish red instead of black, and the patient himself may perceive the light which reaches his eyes through the maxilla. In well-marked cases of unilateral empyema the transillumination is much greater on the healthy than on the diseased side especially in the outer part of the infra-orbital region. Although very valuable, transillumination is not always conclusive, since the bones may not be symmetrical in thickness, or the antra in size, shape and partitioning. Sometimes both sides of the face remain opaque on transillumination; this may be due to the presence of an empyema on both sides or it may be due to universal opacity of the tissues or to insufficient illumination power in the lamp.

(d) *Exploratory puncture* is the only certain means of diagnosing the presence of pus in the antrum. The puncture may be made through the empty socket of the first or second molar tooth, through the canine fossa or through the inferior meatus of the nose. The exploratory puncture should be performed as aseptically as possible, lest suppuration be set up in a previously healthy antrum.

Treatment. There is considerable divergence of opinion as to the best method of treating these cases. In a few cases due to dental decay the disease disappears spontaneously after removal of the offending tooth, but in the vast majority of

cases it is necessary to drain the antrum and irrigate its cavity with antiseptic and astringent lotions. It is impossible to treat all cases successfully in the same way ; our method of treatment must be adapted to the pathological nature of the case as far as our means of diagnosis enable us to do so. It will be advisable therefore to describe the methods of treatment usually employed and then to indicate as far as possible how we should determine the most suitable kind of treatment for each particular case.

(1) *Opening through alveolus.* This is the method which is most commonly adopted after extracting a decayed molar tooth. An opening is made into the antrum through the apex of the alveolus by means of an antrum perforator (Fig 23) or a drill worked by the dental engine.



Fig. 23.—Antrum Perforator.

Sometimes after extraction it is found that the socket already opens into the antrum; it is then only necessary to enlarge the opening to a size sufficient to admit the drainage tube ; this may be accomplished with a bur about $\frac{3}{16}$ of an inch in diameter. The drainage tube should consist of a plain straight gold tube attached to a plate fitting the adjacent teeth. The lumen should be at least an eighth of an inch in diameter ; many tubes are made so narrow that the smallest drop of pus occludes them ; the upper end of the tube should just reach the antrum, and should not project into it or it will not act as a drain until the pus has accumulated in the cavity sufficiently to reach the level of the extremity ; the mouth of the tube should be provided with a plug which can be inserted by the patient at meal times so as to prevent the entrance of food. The tube having been satisfactorily adapted, the patient is prescribed a lotion consisting of ten grains of sulphate of zinc

and ten grains of carbolic acid to the ounce of water ; of this lotion one teaspoonful should be added to a tumbler of tepid water for each injection. A very suitable apparatus for injection is that shown in Fig. 24. The patient, seated before

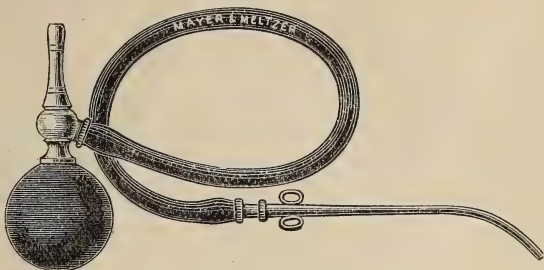


Fig. 24.—Heath's Injecting Apparatus.

a mirror, injects until the fluid returns clean through the nose. The injection is performed twice daily, and then at longer intervals as the discharge diminishes. When the injection brings away no pus after a week's interval, the tube may be removed. In this way many cases may be cured, but the treatment must usually be carried on for five or six months.

2. *Opening through the Nose.* The natural opening into the meatus is much too high to be of any value for purposes of drainage or irrigation. It is therefore necessary to make an opening through the outer wall of the inferior meatus. The opening should be made by means of a Krause's trocar introduced through the outer wall of the meatus well behind the anterior extremity of the inferior turbinated body so as avoid injuring the nasal duct. The cavity is then washed out with a suitable antiseptic or astringent lotion. In this method of treatment, the injection cannot be done by the patient himself.

3. *Opening through the Canine fossa.* The lip having been well retracted, an opening is made about half an inch above the margin of the alveolus and half an inch external to

the prominence produced by the root of the canine tooth. If it is only desired to wash out the cavity it will suffice to puncture with a trocar and canula. The opening may be kept patent by means of a small spiral spring tube attached to the teeth. If it is desired to explore the interior of the antrum, and curette the lining membrane, it is necessary to make an opening with a chisel or gouge large enough to admit the finger. In making such a large opening it is desirable to leave the disturbed portion of bone still attached by one aspect so that when the operation is concluded it may fall back into place like a valve. No bone should be completely removed.

It now remains to discuss the all-important question as to what method of treatment should be adopted in any given case, and here the great difficulty we have to contend with is that we are unable to discover the exact nature of the pathological changes which have taken place in the antrum; we do not know whether the mucous lining is simply inflamed and secreting pus, or whether it is greatly thickened and altered in structure, or whether polypi are present, or whether there is any necrosis of the bony wall, or whether the cavity is divided by septa to such an extent as to render drainage by a single opening impossible. These considerations coupled with the tedious course that these cases often pursue under treatment have lead some surgeons to advise the making of a large canine fossa opening in every case; but other surgeons recognising the fact that many cases are cured by simple drainage and irrigation object to the performance of the operation. For my own part, if there is a carious tooth present, I advise that it should be extracted, and the antrum drained and irrigated through the vacant socket in the manner already described. If the disease is not cured in six months, I advise the making of a large canine fossa opening, so that the nature of the antral disease can be discovered

and dealt with effectually. In cases which refuse to get well with alveolar drainage properly carried out, it is usually found either that the mucous lining is much thickened and polypoid in nature, or else that the presence of septa has prevented the whole of the cavity from being drained. Diseased mucous membrane should be removed with a curette and obtrusive septa should be cut away. If the ostium maxillare should be found blocked, it is desirable to make an additional opening through the inferior meatus. After the operation the antrum should be filled with a long strip of gauze soaked in iodoform emulsion ; after twenty-four hours the gauze is removed, and the cavity syringed twice daily until the discharge ceases ; this usually occurs in a fortnight or three weeks. Some operators have found great difficulty in getting the opening to close, whilst others have complained of inability to keep the opening patent long enough to effect a cure ; the tendency of the opening to close, or remain open, depends on the size of the original opening, and whether any bone has been removed or not. If care be taken to make the opening in the way described, it may be kept open as long as desired by the introduction of some form of plug, and will close spontaneously when allowed to do so.

If there is no carious tooth present it is not justifiable to remove a sound one for purposes of alveolar drainage. In such a case drainage and irrigation should be effected through the nasal route if the patient can attend often enough, or through a small canine fossa opening if he must himself conduct the after treatment.

If there is any polypoid condition in the nose and no evidence of dental disease it is advisable to proceed at once to exploration of the antrum by means of the large canine fossa opening.

EMPYEMA WITH BLOCKED OSTIUM MAXILLARE.

When the opening into the middle meatus is blocked the symptoms differ widely from those just described. There is no nasal discharge, but the pus increasing in quantity distends the antrum producing a swelling on the face. (Fig. 25,)



Fig. 25.—Empyema of antrum with blocked ostium maxillare.

The rapidity with which this distension occurs varies considerably in different cases. Sometimes the distension is rapid and is accompanied by symptoms of acute or subacute inflammation; there is pain at first of a dull deep-seated character but soon becoming more acute and lancinating and attended with tenderness of the cheek and general febrile disturbance. Sometimes the distension takes place not only in the direction of the cheek but also towards the nose, obstructing respiration on the affected side, and towards the eye displacing that organ and interfering with its function.

In the acute or subacute varieties the empyema soon bursts either into the mouth, the nose, or the orbit, in the latter case producing dangerous and sometimes fatal cellulitis.

In the more chronic cases the distension extends chiefly in

the direction of the face producing a swelling indistinguishable from a cyst except by exploratory puncture. In such a case the important point in diagnosis is to determine that the antrum is distended by fluid and not by a new growth. It is often possible to obtain fluctuation and the so-called egg-shell crackling through the thinned-out bony wall, but no time should be lost in making an exploratory opening, the surgeon being prepared at the time to grapple with any morbid condition he may find.

Treatment. The swelling must be freely opened where it bulges inside the mouth and the contents of the antrum dealt with according to the condition found. An opening should be made in the inferior meatus if the patency of the ostium cannot be readily re-established. Any carious tooth in connection with the antrum should be removed.

CONTOUR FILLINGS.

T. J. HUNTINGTON.

The first requisite of contour filling is plenty of space in which to work. While there is much difference of opinion as to how much cutting away should be done in the preparation of cavities, the best plan is to pretty freely cut away all frail portions, or portions which, unless cut away, will, when the cavity is filled, bring the line between filling and enamel in contact, when the filling is finished, with the neighbouring tooth. The sacrifice of enamel and dentine sometimes seems unnecessary, but more failures come from the lack of free cutting than from the opposite. If there was more cutting away of the lateral margins of approximal cavities at the crevices of teeth, there would be less fault found with the efficiency of filling materials.

British Journal of Dental Science.

LONDON, OCTOBER 15, 1895.

THE OPENING OF THE MEDICAL SCHOOLS.

Again the various congregations of students at the Medical Schools have sat and listened to, and we hope profited by, the time-honoured "Introductory Addresses." Some of these seem to have possessed more than the ordinary interest, and although it is sometimes the fashion to refer to such an address as a routine affair which must be undertaken, whether the orator and audience like it or not, yet it naturally occurs that there is great value in the ideas presented. In some instances much that is of local interest, say in the history of the School, is made use of to "point a moral and adorn the tale." In others, some large subject is taken up and exhaustively dealt with, but even then there is a certain charm given to the discourse, due to the individuality of the lecturer.

At St. George's Hospital, Mr. G. D. Pollock was able to recall the names of several distinguished men who might well serve as examples to the budding student, and in his advice to the latter he deftly turned attention to the question of idiosyncrasy. One instance quoted was as to salivation by mercury. The speaker had operated on a case of cleft palate with every prospect of early and complete union. "In almost all operations of the mouth the tongue often becomes much coated. The house-surgeon of the day considered it desirable to order a dose of calomel in consequence of the state of the tongue the day following the operation." The patient was freely salivated, all union in the wound was arrested, and the operation useless for the

time being. Perhaps one of the most interesting addresses from the students' point of view, was that delivered at University College, Liverpool, where the audience had the good fortune to listen to Mr. JONATHAN HUTCHINSON, who took for his subject "The Examination Question." We have not space to deal with the address *in extenso*, which well repays perusal; but we may note that in making suggestions applicable to all examinations, Mr. Hutchinson recommends that the personal element, that of the examiner, should be eliminated as far as possible. In order to ensure this, *viva voce* examinations should be reduced to a minimum. A self-confident examiner may allege that he can tell better what was in a man by five minutes conversation than by reading any number of his papers, but Mr. Hutchinson considers that such judgment of men by personal inspection is often most fallacious. On the other hand, we have known instances of candidates who preferred this method of examination, and who thought they were thus better able to do themselves justice, and able to compensate for feeble power of composition in written answers. Mr. Hutchinson, however, does not condemn objective examination such as the identification of specimens, the use of the microscope and clinical diagnosis, but he thinks that "there are few subjects in which a candidate is not likely to do himself justice (whether to his advantage or otherwise) in a quiet half-hour with pens and ink." Even in the setting of papers he has an innovation to suggest. The examiners should not be allowed to extemporise their questions but should select some out of an approved list which might be revised and published every five years. In order to avoid the evils of cramming it is proposed that a third of the questions selected should necessitate the observation or description of something. Many other interesting points were dealt with in the suggestive but clear and able address of the distinguished lecturer.

At the Mason College, Birmingham, Professor Percy Frankland delivered an extremely able address on Pasteur and his work, referring also to the debt which Medicine

owes to Chemistry. At Middlesex, Dr. Mickle discussed the manner in which our knowledge of a simple external object is obtained, and drew conclusions as to what are the only proper, natural, and fitting methods of medical study. The acquirement of knowledge by children of a simple object is a gradual affair, and only successful after many attempts. From this instance in mental development analogy was drawn to what should be done in undertaking the study of Medicine. It was only to be expected that Antitoxins should receive [some notice, and in addition to Professor Frankland's allusion at Birmingham, the subject was dealt with at Westminster, by Dr. Monckton Copeman, who also gave a short account of his own work with small-pox and vaccinia. The results obtained appeared to show that the specific organism in both these diseases was a small bacillus which stained with great difficulty.

YOUNG AMERICA *versus* BACTERIA.—An American Dentist has described the methods he adopts to teach his children to attend to their teeth. A pecuniary reward seems the practical inducement. Theoretically, they are taught that scale, or animalculæ, gather in a mouth and on teeth that are not cleansed ; and that the only way to keep the horrid creatures off the teeth is to brush them frequently. “Not many mornings ago I was somewhat shocked and very much amused on entering the bathroom, where my four-year-old hopeful was scrubbing his teeth with powder and *hot* water, to hear him exclaim in the most triumphant manner : ‘ Papa, I’m scalding the bugs ’ !”

ALLIGATORS’ TEETH.—We read that a new and remarkable industry has sprung up in America—that of artificial propagation of alligators for supplying the trade in Florida curiosities. The incubator system is employed. In 1890 about 250 pounds of alligator teeth were sold, hunters

receiving from 4s. to 8s. a pound for them. They are removed by burying the heads and rotting out the teeth. Of the best teeth about 70 make a pound. The stuffing of alligators and the polishing of the teeth give employment to 40 persons. Unfortunately alligators grow very slowly. At 15 years of age they are only 2ft. long. As these animals have a continuous succession of teeth, we presume the "cultured" ones are not killed for a single crop of teeth but that successive harvests are garnered, perhaps under Nitrous Oxide!

DEATHS FROM CHLOROFORM.—At the Newport Infirmary a man named Amos Duffield, aged 47, died from syncope whilst under the influence of chloroform which had been administered for an operation. The coroner's jury found that the house surgeon had exercised all the precautions necessary, and returned a verdict of "Death from syncope." Thomas Frederick Perks, aged 50, of 1, Belle Vue, Shrewsbury, died on September 10, in the Salop Infirmary, from the effects of chloroform whilst undergoing an operation. Verdict: "Death from misadventure." Dr. David H. Dyte, aged 56, of 31, Mildmay Park, London, died on September 14, at his surgery, 12, Derby Street, King's Cross, from the effects of inhaling chloroform. Verdict: "Death by misadventure." Ellen Louisa Livermore, aged 17 months, whose parents reside in Preston Street, Kentish Town, died on September 20, while under the influence of chloroform at University College Hospital, during an operation. A verdict in accordance with medical evidence was returned.

SOLDIERS' TEETH.—An Indian newspaper is responsible for a statement of some interest. At the close of the active operations in the Chitral campaign an epidemic of toothache appeared amongst the officers. Nothing is said about the non-commissioned officers and men who may be supposed to

have paid less attention to their teeth, when at home, than even their officers had done. We are told that the matter is receiving the serious attention of the medical authorities and the report even goes so far as to say that Sir Robert Low has advised that on all future expeditions a regular staff of dentists should be appointed under a Brigade—Dentist—Major—General! A careful investigation is taking place, and the statistics should show whether the Indian paper is quite serious or whether it regards the need of officers for dental attention as the outcome of an order that the various regiments were to stand fast for the summer. It seems the epidemic reached its most violent form just before the long expected order to partially evacuate the country had arrived.

INFECTION THROUGH THE TONSILS.—We have already published a reference to Professor Dieulafoy's communication upon the entrance of the tubercle bacillus through the tonsil. It seems that other constitutional diseases, besides tuberculosis, may originate in the same way; for instance, in such conditions as osteomyelitis and suppurative periostitis the micro-organisms found in the bone affection are the same as those found in the tonsil. The following conclusions should be interesting to the Dentist:— (1) The tonsils may constitute a gate of entrance for pyogenic organisms, even in the absence of ulcers or diphtheritic lesions of the mucous membrane. (2) This role of the tonsils in the ætiology of osteo-myelitis and various other suppurations is probably more important than that of the mucous membranes of the intestine and the respiratory tract. The inference from these observations is that cleanliness and care of the mouth and pharynx are of great importance as a means of preventing certain diseases, especially acute suppurating osteomyelitis.

Abstracts of British & Foreign Journals.

AN INQUIRY CONCERNING THE SAFETY AND SPHERE OF APPLICABILITY OF CHLOROFORM IN DENTAL SURGERY.

By FREDERIC HEWITT, M.A., M.D. Cantab.

In concluding his communication the author sums up the evidence against chloroform, and urges that, in the interests of the public and of the medical and dental professions, it should only be used on the most exceptional occasions. He maintains that the safest anæsthetic should be employed for each particular case: nitrous oxide for short operations; ether for longer ones; chloroform only being applicable when the state of the patient is such that ether cannot be given. The chief reason why ether is not more widely used is that there is a want of proper instruction in ether-giving. When it is administered skilfully, the anæsthesia is equal to that of chloroform from the operators's point of view, and far safer. The surroundings in dental operations are not nearly so favourable, so far as the anæsthetic is concerned, as in ordinary surgical cases. Moreover, the postures which are most convenient to the dental surgeon are the very worst from the anæsthetist's point of view. In addition to this there is the point of extreme importance, *viz.*, that as the operation of tooth extraction under general anæsthetics often involves some asphyxial condition, either from posture, the presence of blood, the effects of the anæsthetic itself, or other causes, chloroform is contra-indicated, owing to the liability of the circulation of a chloroformed patient to rapidly fail in the presence of any asphyxial state. This is not so with nitrous oxide or ether.

The chief points to which attention should be paid in the administration of chloroform for dental operations are :—

1. Seeing that there is a liability when chloroform is used in dental operations for undetected embarrassment of breathing to arise, it is of paramount importance that the administrator should make *absolutely certain from the commencement of the administration till consciousness is restored*, that air is entering and leaving the chest. Mechanical obstruction within the air-tract, from the numerous causes which were fully discussed, is very prone to arise ; and unless the administrator actually hears or feels throughout the administration that

breathing is proceeding, he will be very liable to be misled.

2. The administration should be conducted with the patient in the dorsal posture, the head and shoulders being so adjusted by pillows that the head is neither flexed nor extended.

3. Owing to the fact that breathing is liable to become interfered with by either extending or flexing the head upon the trunk (a point to which the author wishes to direct special attention), an attempt should be made to keep the head as far as possible in the longitudinal axis of the body. Should it become necessary to throw the head well back, this should be done when the patient is properly under the anæsthetic, care being taken whilst this extension is present that no blood or extracted teeth gravitate toward the now insensitive and open larynx.

4. Care should be taken during operations upon the lower jaw, or when employing a mouth-gag or prop, that the depression of the lower jaw does not interfere with breathing by causing the tongue to meet the pharyngeal wall.

5. Intercurrent asphyxia from the causes which are given is far more likely to arise during light than during deep anæsthesia, so that the administrator should be on the alert for it just as the patient is entering and leaving the later state.

6. The patient should be placed deeply under chloroform before any operation is begun. Should any signs of recovery manifest themselves before the operation is completed, care should be taken in re-applying the chloroform; the patient's head should be turned to one side, free air-way maintained by means of a gag, and from this point onwards only a moderately deep anæsthesia should be kept up.

7. Patients with naso-pharyngeal adenoid growths, enlarged tonsils, or nasal polypi, should be anæsthetised with special care, owing to the greater tendency to become asphyxiated which such patients naturally display.

8. At the conclusion of the operation the patient should at once be turned upon his side, a Mason's gag being placed between his jaws till consciousness is restored. The side posture allows all blood to drain from the mouth and fauces, the tongue to gravitate towards the cheek, and by reason of the free respiration thus established, chloroform to readily escape from the circulation.

MALOCCLUSION.

By W. H. H. BARKER, Huron, S. Dak.

In considering this question we must take the teeth as an aggregation. And yet we cannot eliminate them as units, nor fail to consider them in their individuality to some extent, as each one plays a significant part, and thus contributes to the whole. Passing by the anatomical form of any tooth, or class of teeth, as units, their location in either arch, or their individual adaptation to their special uses, we come to note these facts, viz. : First. That in occlusion no tooth except the inferior central incisor, and the superior dens sapientia but impinges or rests its morsal surface upon at least two of its fellows in the opposing arch, and second, that each in its own arch, except the dens sapientia, impinges on its mesial and distal surface with the same number of its fellows in its own arch. Upon these two facts are based many laws which should never be lost sight of nor ignored in any operation in the oral cavity, so far at least as the teeth are concerned.

One of these laws, and the one that perhaps is the least considered, is that of facial expression. There cannot be a perfect face where there is a malocclusion. It is evident that the jaws and teeth make or mar, to a great extent, "the human face divine." If there is a malposition of a single tooth, or even the lack of one, there must follow the want of perfection in the adjacent tissues, both hard and soft, as they are interdependent, and have a lack of symmetry which a perfect type demands. No part of the face is so subject to change as that bounded by the maxillaries. Infancy, youth and old age proclaim these truths to every beholder. They are seen in the undeveloped face of the child. Again, more markedly in the sunken lips and cheeks of the partly edentulous jaws of the adult, and still more so in the advanced in age when the perfectly edentulous jaws causes that markedly wrinkled, shrunken appearance as seen in the near approach of the nose and chin. These are only a few of the ills manifested in facial expression as the result of malocclusion.

Again as to the voice. How much depends upon occlusion, and how often does malocclusion interfere and prevent clear, distinct and perfect articulation. How often does the want of impingement of the morsal surfaces of the teeth allow a dis-

arrangement of the whole apparatus. Elongation, or protrusion are marked features, and most seriously interfere with the free movements of the lips and tongue, and these in turn interfere with enunciation to such an extent that in many cases the voice is marred beyond recognition and almost beyond redemption. This is a feature that calls loudly for remedy at the hands of the dental surgeon and should be much less ignored than it now often is.

It is a physiological law that the full development of an organ and its maintenance in a normal healthy condition is dependent upon its use. Nature allows no drones physiologically, and hence the work designed for an organ must be performed by it, or it suffers in consequence. The dental organs are no exception to the rule. They are made for work, and hard work of the most severe and constant kind. That this work may be done rightly, and to its full extent, there must be no break in either arch, and occlusion must be perfect and complete. Malocclusion does not allow of either normality or healthfulness in the teeth, either as a unit, or as an aggregation; work is their life, and antagonism their salvation. In malocclusion, both, to some extent are wanting, their office abrogated, and they must pay the penalty. Disease readily attacks a single member of the arch, or the whole of that arch if not put to service, and the role of nature is to expunge what is of no service in her economy. Among the many causes of malocclusion, may be noted the following, viz.; Irregularity, a most fruitful source, happily in a large number of cases, remedial. It is seen in its worst form in a crowded condition, and is the result of a want of correspondence in the size of the teeth and jaws. Then comes the lack of the proper number, and results usually, from loss by caries, or extraction after the organ has developed and taken its place in the arch. Next, the wasting of the gums and alveolar processes from mercurial salivation, pyorrhœa alveolaris, the impingement of salivary and sanguinary calculus, and other diseases, causing the teeth to change their position, and to assume new ones, not in keeping with the use for which they were designed, or intended in mastication.

Besides these, there are numberless others, such as abrasion mechanical and chemical, erosion, atrophy, hypertrophy and exostosis, aside from numerous diseases that attack the antrum of Highmore, and the soft tissues covering and adjacent to both maxillaries.

THE BARBER SURGEONS' HOLBEIN.

Holbeins's last picture, that of the Barber Surgeons, was his largest. It is, as Pepys called it, "not a pleasant, though a good picture," and is painted on vertical oak boards, being 5 ft. 11. in. high by 10 ft. 2 in. long. It seems to have been begun about 1541, according to a writer in *The Leisure Hour* for September, and finished after Holbein's death in 1543, and it has evidently been altered since its first delivery. The tablet, for instance, was not always in the background, for the old engraving in the College of Surgeons has a window in its place, showing the old tower of St. Bride's, and and thus indicating Bridewell as the site of the ceremony. The outermost figure to the left, too, is omitted, and, according to some critics, the back row of heads are all post-Holbeinic. The names over the heads appear to have been added in the time of Charles I., and it is significant that only two portraits in the back row are so distinguished.

The painting was really done in commemoration of the passing, on July 25th, of the Act of Parliament officially known as 32 Henry VIII., Cap. 42, by which the Guild of Surgeons was incorporated with the Barbers Company. The union of the Surgeons and Barbers, which lasted until June, 1745, when it was dissolved by another Act of Parliament, was well worthy of commemoration. For years the two guilds had been more or less at variance, although occasional working agreements had been entered into which smoothed the way for the coalition that at the time seemed the only satisfactory plan. A thousand years ago the healing art, such as it was, was entirely in the hands of the ecclesiastics and the Jews. The clergy had the bulk of the practice; it seemed to be only natural that they should have the cure of the bodies as well as that of the souls. But about 1150 there arose an anti-something agitation—as such agitations nowadays arise—which required the clergy to abstain from surgery, "as surgery required the shedding of blood." In 1163 this came up at the Council of Tours, and the agitators had their way. Then a curious thing happened. The clergy being tonsured could not do without the barbers to keep their heads shaved, and the knights of the razor were just the sort of men likely to be of use in surgical operations. In fact, the monk's barber was generally his assistant in such matters, and when the Council's

decree was passed the monk kept to medicine and handed over surgery to his assistant. Hence the barber surgeons. It did not take long, however, for the younger men to discover that there was no necessary connection between hair-cutting and surgery, and, in fact, that the association was rather absurd; so that in a very few years the more educated and scientific men dropped the shaving and practised as surgeons only. The barber surgeons in time formed themselves into a guild—it was in 1308 that Richard le Barber was sworn in at Guildhall as first Master of the Barbers' Company; the surgeons also came to have their guild, and the sort of feeling that existed between the two guilds is conceivable. This Act of 1540 was a sort of eirenicon. The property of both guilds was thrown together. The Company was to consist of surgeon and barbers, "no surgeon to practise barbery; no barber to practice surgery, except in so far as drawing teeth;" and to encourage the study of anatomy the King did graciously assign the Company four malefactors per annum for dissecting purposes.

The Medical Press.

REPORT OF THE COLLECTIVE INVESTIGATION COMMITTEE ON ANÆSTHESIA AT THE RECENT SURGICAL CONGRESS IN BERLIN.

Professor Gurlt, Berlin, in presenting the report of the Committee on anæsthesia, said that, on the proposition of the Society, he had carried out the investigation to a fourth year. In 1893, sixty-three reports had been received, of which nine were from abroad. Fifteen reports had been sent from twenty-one German university clinics. The total of last year's cases was fifty-one thousand eight hundred and forty-six. Of these, thirty-two thousand seven hundred and twenty-three were chloroform administrations, eleven thousand six hundred and seventeen of ether, three thousand eight hundred and ninety-six with ether and chloroform, seven hundred and fifty with chloroform, ether, and alcohol (Billroth's mixture), two thousand seven hundred and sixty-nine with bromide of ethyl, ninety-one with nitrous oxide. The total fatalities were

twenty, and of these, seventeen were due to chloroform. The average death-rate was one in two thousand five hundred and eighty seven administrations. The death-rate from chloroform was one in one thousand nine hundred and twenty-four.

When the results of the previous year were added, the totals were one hundred and sixty-three thousand four hundred and ninety three administrations, with sixty-one deaths. The rate of mortality was : chloroform one in two thousand six hundred and fifty-five : chloroform and ether, one in eight thousand and fourteen ; Billroth's mixture, one in twenty-six thousand two hundred and sixty-eight. In fact only one death had occurred from ether narcosis, and that was a case of heart-disease. In correspondence with the low death-rate from ether, its employment had largely increased of late years, from six thousand two hundred in 1892 to eleven thousand six hundred in 1893. Pitchet's purified ice chloroform had been used three thousand eight hundred and ninety times, with two deaths, so it would appear that the dangers of chloroform inhalation did not lie in any accidental impurity ; indeed the facts seem to point the other way, and that the danger was directly proportionate to the purity of the chloroform. This consideration had lately led to a different mode of administration. It had been given more slowly, and occasionally atropine and cocaine had been used with it,

As regards accidents, two hundred and fifty-five severe cases of asphyxia had occurred, and tracheotomy had to be performed three times. König's cardiac massage, so called, was frequently used, but not always with success. Ether had, therefore, shown itself the least dangerous anæsthetic, ten times less dangerous than chloroform, but it was not without its shady side : it was dangerous in lung-affections. It was agreed to still continue the investigation.

The Dental Register.

EROSION OF THE TEETH IN CHILDREN.

By J. KINGSTON BARTON, M.R.C.P. Lond.

Mr. Kingston Barton defined this as an absence of enamel in different degrees with varying appearances according to the resistance of the exposed dentine to the destructive pro-

cesses of micro-organisms. Various causes had been assigned to this condition, such as syphilis or convulsions; but it became evident on closer examination that it was an error in development taking place in the suckling period to which the disease was really due. Out of 202 children he had found 10 cases of well marked erosion of the permanent teeth, and 5 cases of erosion of the milk teeth. These latter occurred out of 67 hand-fed children. Of the 202 cases 54 were fully breast fed, and there was no case of erosion among them. Two cases of very early and severe decay were associated with very bad artificial feeding.

In one case in which there had been temporary bad feeding with a patent food in an infant 6 weeks old, the permanent teeth showed a horizontal line marking the period at which the nutrition of the child had suffered. The development of the milk teeth took place so early that probably only errors in the mother's health during pregnancy could affect them.

The development of the permanent teeth began 3 months before birth, and ended with the development of the second molar soon after the third year. As this last tooth never exhibited erosion, the cause producing it was certainly antecedent to the third year. All the evidence went to show that bad feeding was the main cause; and with regard to convulsions it was probable that the bad diet causing them caused also the erosion.

He added a short scheme of diet for children up to the third year.

British Medical Journal.

SYPHILITIC TEETH AND ICTHYOSIS.

Dr. Roussel, physician to the Hôtel Dieu of St. Etienne, publishes (*Loire Médicale*) a second case in which he has noted the occurrence of ichthyosis in a patient exhibiting teeth of the typical character described by Mr. Jonathan Hutchinson. Dr. Roussel explains the co-existence of dental and cutaneous malformation by the fact that the skin and dental apparatus have a common origin, both being derived

from the external layer of the blastoderm. The patient was a girl, æt. 21. The upper and lower incisor and canine teeth presented characteristic defects. The skin of the whole body was mal-nourished, dry, rough, and inelastic. The outer aspect of the arms was covered with small projections due to hypertrophy of papillæ. The summits of these projections were crowned by horny pellicules, which could be rubbed off. The legs, particularly externally, presented a similar condition being covered with small papules, of which the summit was formed by a scale. Desquamation existed also at many points where papillary projections were not present. If a considerable extent of skin were drawn together by the hands it showed very plainly the ichthyosis appearance—that is, a great number of lozenge-shaped markings became visible.

The Medical Press.

KONIG-MAAS'S METHOD OF RESTORING PERSONS APPARENTLY DEAD FROM CHLOROFORM.

The following is a description of the method as practised at the Gottingen clinic:

The operator, standing on the left of the patient and facing him, places the ball of the thumb of the opened right hand upon the patient's chest, between the place of the apex beat and the sternum. He then repeatedly presses in the thoracic wall with a quick, strong movement, at the rate of about one hundred times per minute. The results by this method have been very satisfactory.

APPOINTMENT.

Mr. John A. Biggs, L.D.S. Glas., has been unanimously appointed Dean of the Dental Hospital, Glasgow, in the room of Mr. J. K. Brownlie, L.D.S. Eng., who has resigned.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents]

To the Editor of the "British Journal of Dental Science."

ALPHABETICAL DENTAL CATALOGUE.

Dear Sir,—In your review of my new Catalogue, you seem surprised that I include in it "Tooth-Keys" which you appear to imagine are obsolete. This is not so, for besides regular inquiries for them from abroad, especially China, I have occasional demands in this country, probably as a specimen of curiosity. No doubt in this country they have died out but it seems that in uncivilized countries, this old instrument of torture is still applied to the natives.

Yours faithfully,
FRANCIS LEPPER.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
6. The Journal will be supplied direct from the office on PREPAYMENT of subscription as under:

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British Journal of Dental Science.

No. 667. LONDON, NOV. 1, 1895. Vol. XXXVII.

DENTAL MECHANICS.

By HARRY ROSE, L.D.S. Eng.

Lecturer in Dental Mechanics, National Dental Hospital.

PLATE WORK.

PREPARATION OF THE MATERIALS FOR PLATE WORK.

The subject of plate work, comprising as it does not only what is understood by the ordinary gold denture, but all such appliances as crowns, bridges, and pivots, or in fact any work where gold is used in the form of wire, or plate, necessitates such an insight into the character and behaviour of metals, that it is obligatory on the part of the practical dentist that he should have a fair knowledge of this interesting and useful art.

Taking, therefore, such an extended view of the subject, we will in the following pages, endeavour to make the student clearly understand the various means by which he can prepare the precious metals, by refining, alloying, melting, rolling, and drawing into wire the various qualities of both plate and solder that he is called upon to use.

Nothing to the author's mind shows more the helplessness of the student or young practitioner, than his having to send out for everything he requires to use.

A want of this knowledge places him, so to speak, in a state of dependence, and is a practical admission that he is only conversant with half his profession. As an introduc-

tion therefore, to the subject of Plate-work, we will call the reader's attention to a few remarks on the subject of Metallurgy, or rather that part of it which deals with the preparation of the precious metals and their alloys.

Gold, silver, and platinum are the only precious metals in general use in the dental workroom.

The first-named, gold, is the only simple metal of a yellow colour ; it is the most malleable of all metals, and can be drawn into wire of exceeding fineness, or beaten into sheets so thin that it is said one grain will cover a surface of 50 square inches.

For dental work it is seldom used in a state of purity, being in that condition too soft; it is therefore usually alloyed either with silver or copper.

The addition of silver to gold does not interfere with its malleability, but changes its colour, making it paler and giving it somewhat of a greenish tint. The addition of copper, on the other hand, renders it harder, more springy, and gives it a reddish colour.

Silver in its pure state is also too soft to use for dental plates, and when alloyed has the further disadvantage that it tarnishes and becomes in a short time quite black in presence of the oral secretions, owing to its strong affinity for sulphur. When in combination with a good percentage of platinum it forms a very useful metal, known as Dental Alloy, which can be used for dentures when a cheaper material than gold is required.

In other respects this alloy possesses all the qualities of a gold plate, inasmuch as it resists chemical changes in the mouth, does not tarnish more than 18 carat gold plate, and is perfectly free from any disagreeable metallic taste. It has an advantage over pure platinum, inasmuch as it is not nearly so heavy.

The use of platinum as a base plate is usually restricted to

Continuous Gum Work, it being the only metal that will stand the necessary heat required to fire a piece of this work.

How to prepare fine gold.—This may be accomplished either by the dry or the wet method; the dry process is called cupellation, and is a very ancient metallurgical operation. A small cup or dish, called a cupel, is formed by making well burned and finely ground bone ash into a paste, and pressing it into a mould, to the desired shape, and it is then thoroughly dried.

It is afterwards placed in a muffle, somewhat like those used for Continuous Gum Work, or making teeth, with the exception that it is perforated by a number of holes in the sides and back. The muffle is placed in a suitable furnace, and made red hot, and then the gold to which has been added about three times its weight of silver, is wrapped up in sheet lead and laid upon the cupel; the whole is then heated. The lead melts and oxidizes, gives up oxygen to the inferior metals in the alloy, and the excess of lead fusing dissolves the oxides of the other metals and sinks with them into the cupel. The operation is continued until the whole of the lead has disappeared, and a bright mass of gold and silver is left behind. The button of gold and silver alloy is now taken and rolled or hammered out quite thin; it is then annealed, that is, made red hot, and curled round in a spiral form, into what is known as a cornet.

This latter is now put into a flask with nitric acid, which dissolves away the silver, and leaves the cornet dark and brittle, it is then washed with water and again boiled with nitric acid to dissolve out the last trace of silver, and then washed and dried; it can now be weighed and afterwards melted in a fireclay or plumbago crucible with a little borax.

To the solution left, which is silver nitrate, sodium chloride (common salt) is added, which throws down a precipitate which is silver chloride.

The precipitate should be allowed to settle for an hour or so at the bottom of the vessel, and then the liquid may be poured off. The precipitate should next be repeatedly washed with hot water to get rid of the nitric acid, after which it can be dried and fused in a crucible with Pot. carb.

If it is desired to convert the silver chloride into metallic silver, it may be done in the following manner. The chloride after washing should be placed in a porcelain dish, and evaporated nearly to dryness. A number of pieces of iron wire are then taken and pressed into the semi-hard chloride, the same as one would stick pins in a pincushion, and then the chloride is acidulated by the addition of a small quantity of dilute hydrochloric acid. The vessel containing the chloride should not be stirred, but placed on one side for twenty-four hours, when the whole will be found to be converted into metallic silver.

The pieces of iron, or rather what remains of them, are removed and the silver should be well washed with Hydrochloric acid, to remove all traces of iron.

To make sure that iron is not present one ought not to get a blue precipitate by the addition of Ferro-Cyanide of Potassium to the washings.

The metallic silver is now to be dried and mixed with about twice its weight of Pot. Carb., and melted, when it can either be allowed to cool at the bottom of the pot, or it may be poured into a tub of clean cold water, agitating the water with a stick, while so doing. This will form it into grains such as are bought at the refiners.

The preparation of fine silver is effected in the same way as that for gold, the silver being wrapped in lead foil and placed in a cupel and the whole heated until a bright, clear mass of silver is left behind. It may also be prepared by the wet method by dissolving in nitric acid and precipitating with common salt.

To prevent the loss of silver owing to the spitting, and also to the absorption of the fused chloride by the crucible Fletcher, in his work on Metallurgy, recommends mixing the chloride of silver with finely powdered resin in the proportion of 3 of the former to one of the latter. Heat the mixture slowly, until flames cease to be given off and then raise to the melting point of silver, adding a little borax.

To prepare fine gold by the Aqua Regia process.

By the nitric acid process one is enabled to separate all impurities from gold, with the exception of platinum. If our object is to remove traces of this metal we proceed in the following manner :—

Melt and roll the gold very thin, and place in a glass flask. Next make a mixture of about two and a half parts of hydrochloric acid and one part nitric acid, and pour on to the gold to be refined. The flask containing the gold and acid, should be placed in a sand bath, and heated in such a position that the dense fumes may be carried up the chimney. These acids attack and dissolve out the gold and platinum and leave the silver at the bottom as silver chloride.

This should be separated from the gold and platinum solution by pouring it on to a filtering paper; it can then be dried and weighed.

The solution containing the gold and platinum is now evaporated nearly to dryness, and hydrochloric acid added to it to get rid of the free nitric acid. It is then evaporated a second time and afterwards diluted with a large quantity of water. To this solution is now added, a little at a time, proto-sulphate of iron, which will precipitate the gold as a brown powder; this may also be separated from the solution by filtration and afterwards washed in sulphuric acid to get rid of any traces of iron.

To the solution left we now add ammonia chloride, which will throw down the platinum as a yellow precipitate. This

is of no use to the dentist, unless used as a colouring matter, and should be sold.

The gold may also be precipitated from its solution by oxalic acid. When this is added to the gold solution it should be placed on one side for twenty-four hours, and the precipitate dried ; then made red hot to drive off the oxalic acid.

The gold precipitate may now be melted in a crucible with a little borax.

Preparation of Gold Plate :—To make 16 carat gold plate, take—

	Fine gold	...	16 parts,
	do. silver	...	5 „
	Pure copper	...	3 „
<hr/>			
18 carat	Fine gold	...	18 parts
	do. silver	...	4 „
	Pure copper	...	2 „
<hr/>			
20 carat	Fine gold	...	20 parts
	do, silver	...	2 „
	Pure copper	...	2 „
<hr/>			
22 carat	Fine gold	...	22 parts
	Pure copper	..	2 „
<hr/>			

These materials should be obtained from the refiners, the copper being either in the form of wire or electrotpe.

Another method of preparing gold plate is to use the ordinary gold coin of the realm. This is of 22 carats fineness, and from its known quality and toughness is always reliable for alloying purposes. The English sovereign weighs 5 dwt., $3\frac{1}{4}$ grs., and contains 113 grains of pure gold.

To reduce sovereigns to 16 carat gold, we must add to each coin 46 grains of alloy.

For 18 carat gold $27\frac{1}{2}$ grains of alloy. And for 20 carat gold $12\frac{1}{2}$ grains.*

Coin silver may be used as the alloy, but it is rather a wasteful method ; equally good results are obtained by using fine silver, at about half the cost of the first-named. The gold will be found quite hard enough for all practical purposes.

To make hard or spring gold.—This is made by adding, say to 16 parts of fine gold, 4 parts of copper, and 4 parts of silver. This alloy should be melted first, and then added in the proper proportion to the gold.

Hard gold is used for making clasps, the ordinary 16 or 18 carat gold being too soft for that purpose.

The addition of a small quantity of platinum also makes gold hard and springy, but for all practical purposes the addition of copper is sufficient.

(To be continued).

ORAL SURGERY.

By EDMUND W. ROUGHTON, B.S., M.D. (Lond.), F.R.C.S.
Eng.

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(Continued from page 945.)

ODONTOMES.

Odontomes are tumours composed of dental tissues in varying proportions and different degrees of development, arising from tooth-germs or from teeth still in the process of growth. (Bland Sutton).

As the pathology of this class of tumours is intimately connected with the development of the teeth, it will be well to remind the reader how a tooth is formed.

* Fletcher's Dental Metallurgy.

Early in intra-uterine life the epithelium of the gum sends down a process into the subjacent tissue extending the whole length of the jaw (*common enamel germ*). From the deep aspect of the common enamel germ a number of flask-shaped epithelial bodies project (*special enamel germs*). Each is connected with the common enamel germ by a narrow band of epithelial cells (*funicular bands*). Each special enamel germ is met and indented by a differentiated portion of the subjacent connective tissue (*dental papilla*), the arrangement being comparable to a finger pressed into a flaccid india-rubber ball. The connective tissue around the papilla and enamel germ becomes fibrillated and forms a kind of capsule (*dental sac* or *follicular wall*). The complete structure is called a *dental follicle*.

The enamel germs of those permanent teeth which replace temporary ones are formed by an outgrowth from the funicular band. Sometimes an epithelial outgrowth springs from the funicular band of the permanent tooth, and represents the enamel germ of the third dentition of some animals.

The enamel germ of the first permanent molar is given off from the posterior extremity of the common enamel germ. The enamel germ of the second molar springs from the funicular band of the first, and that of the wisdom tooth from the funicular band of the second. The whole of the epithelium of the enamel germs does not become converted into enamel, the funicular bands and rudimentary third enamel germs remaining as collections of cells under the gum and in the alveolo-dental ligament. Occasionally these embryonic remains spring into activity after all dental development has ceased, giving rise to some interesting tumours to be considered presently. The permanent teeth are surrounded by bone except where the funicular band remains. In this situation there is a canal in the bone (*iter dentis*) occupied by a fibrous band (*gubernaculum*) containing epithelial remnants

of the funicular band. The permanent tooth reaches the surface and is "cut" by travelling along the iter.

The following table shows at a glance the portion of the tooth and the kind of tumour attributable to each part of the embryonic structure.

EMBRYONIC STRUCTURE	ADULT STRUCTURE	TUMOUR
Enamel Organ	Enamel	Epithelial Odontomes and one form of den- cysts
Papilla	Dentine and Pulp	Radicular Dentomata and Osteo-dentomata
Dental Sac or Follicular wall	Cementum	Cementomata Fibrous Odontomata Follicular Odontomata Compound Follicular Odontomata
Complete germ	Tooth	Composite Odontomata

EPITHELIAL ODONTOME.

Although this disease was first described seventy years ago it is only during the last few years that its true pathology has been appreciated. The older works on Surgery called it multilocular cystic disease, cystic sarcoma, and adeno-sarcoma; the first of these names accurately described the naked-eye appearances of the tumour, but the two other names erred in inferring the microscopical structure from the macroscopical appearances. In 1879 Falkson and Bryk recognized that the microscopical structure of the tumour was almost identical with the enamel organ. In 1882, Eve whilst recognizing the true structure of the tumour attributed its origin to an overgrowth of the epithelium of the gum of a cancerous nature, a view not in keeping with the clinical history of these growths.

Morbid Anatomy and Pathology. These tumours most commonly affect the mandible. They grow between the plates and expand them in an irregular manner. On section the tumour is seen to be composed of a congeries of cysts varying in size from an inch in diameter down to minute cavities too small for the eye to perceive. The cysts usually contain a brownish mucoid fluid. They are separated from one another by solid septa which are composed partly of the expanded and displaced bone and partly of a reddish-brown material which consists of the proper tumour substance which has not as yet become cystic. The method in which the cysts are formed is explained by a microscopic examination of a section of the solid portion of



Fig. 26.—Epithelial Odontome of Mandible.
The tumour consist of a congeries of cysts of varying size.

(From the Museum of St. Mary's Hospital.)

the tumour. It is then seen that the tumour consists of columns of epithelial cells separated from each other by connective tissue septa.

The epithelial cells appear to be arranged in rounded alveoli, but the appearance is simply due to the long tortuous columns of cells being cut across. The cells at the periphery of each column are columnar in shape, but as we trace them

towards the centre, we find that they are undergoing mucoid degeneration so that small spaces are formed. It is by the distension of these spaces that the large cysts are formed.

The section of these epithelial columns presents a very close resemblance in structure to an enamel organ, but there is never any formation of enamel.



Fig. 27.—Section of an Epithelial Odontome.

From a photo-micrograph—Magn. 100 diam.

The connective tissue stroma of the tumour is composed of fibrous tissue with a few nucleated cells, and contains but few blood vessels.

These tumours are supposed to originate from those portions of the enamel germs which do not in the ordinary process of development become converted into enamel (*paradental epithelium*). We are completely in ignorance as to why

these cells should lie dormant for years and then suddenly start into activity as if they were afflicted with a nightmare and felt compelled to grow into enamel organs of fanciful shapes and extraordinary dimensions.

Clinical characters.—This disease may occur at any age, but is most commonly seen about the age of twenty. It most often affects the molar region of the mandible; when it affects the maxilla the tumour usually occupies the antrum. It grows very slowly; a tumour the size of an orange may have been growing for ten years. It expands the jaw, sometimes equally in all directions, sometimes the inner and sometimes the outer plate is more bulged than its fellow. The surface of the tumour is rounded and more or less lobulated. To the touch the bulk of the tumour is of bony hardness, but there are usually one or more spots where the growth can be indented by the finger, showing that it is really cystic. Sometimes one or more of the cysts burst into the mouth and discharges a dark brown fluid. Some of the teeth belonging to the affected portion of jaw are very often missing, and those that are present are usually much disturbed in position. The neighbouring lymphatic glands are not affected. The disease does not recur locally after complete removal, and dissemination in other parts of the body does not take place. It will be seen therefore that the disease is essentially innocent in nature, as innocent in fact as the ordinary fibro-adenoma of the breast. But this is not always so; sometimes the connective tissue stroma instead of being purely fibrous is sarcomatous in nature. In such tumours recurrence *in situ* after removal and dissemination may take place. It is very doubtful if the epithelial elements of the tumour are ever malignant. Heath records a case (Diseases of the Jaw, p. 206), in which a typical epithelial ulcer appeared in the situation from which a “cystic sarcoma” had been removed eleven years previously; the facts

recorded in reference to this case are very far from sufficient to prove that the original tumour was a malignant one.

Treatment. The whole growth must be completely removed, but it is not necessary to remove any surrounding healthy tissue. If the growth be not completely removed the portion left behind will continue to grow, and will in time produce a tumour as large as the original one ; this is not recurrence in the sense in which the word is used when speaking of malignant tumours.

The operative procedure necessary to remove the growth must be determined in each case by its size and situation. If it be small and accessible from the mouth, it is better to operate from within so as to avoid deformity from scarring. An incision must be made through the mucous membrane of the mouth, and the growth completely gouged away, so that nothing remains but a cavity with healthy bony walls. The bony walls, if much expanded, may be pressed together, care being taken not to fracture the jaw.

If the growth be too large to be dealt with from inside the mouth, it must be exposed through an incision on the face so planned as to leave the smallest and least noticeable scar.

The cavity in the bone is allowed to granulate up, so that the site of the tumour becomes filled with fibrous tissue.

The solid portions of the tumour should be examined microscopically, particular attention being directed to the connective tissue stroma between the epithelial columns. If the connective tissue contain any sarcomatous elements, recurrence of the growth should be feared, but if formed of mature fibrous or fibro-cellular tissue the cure will be permanent. If recurrence takes place, the affected half of the bone should be removed.

(To be continued.)

ANÆSTHETICS.*

By C. J. OGLE, M.R.C.S., L.S.A.

Mr. President and Gentlemen,—In addressing a meeting of the Students' Society, at the opening of a new Session at this Hospital, where dentistry is the main object of instruction, I could have wished, and probably you would have desired, that you might listen to some subject more closely connected with your own work, than my speciality, and which would have proved of greater interest to you all. For although anæsthetics play a very important part in Dental Surgery, and probably nearly as many extractions are now performed, in the larger centres of population, with as without anæsthesia, their administration should be as much as possible confined to those thoroughly conversant with them, as your own speciality is to those who have been systematically trained during a period of several years. When our probationary study is over, and we have said good-bye to the college for ever, we then begin to feel our feet, and see how much there is still to be learned, improved upon, and to finish. All this comes to the majority of us after long years of observation and painstaking practice, for without constant care our work will not improve, and we are only stationary, or deteriorating, machines instead of progressing to as near perfection as it is possible for imperfect man to become. This merely to point the moral that if we wish to do our work well we must throw our whole heart and soul into it, devote ourselves earnestly to it, and exercise our minds in its performance and as few of us are capable of steadfastly applying ourselves to many subjects, let us concentrate our energies on our own branch, and use our best endeavours to perform that part efficiently.

*Read before the Students' Society, National Dental Hospital.

Now all here this evening have seen Nitrous Oxide administered very frequently, and I do not wish to weary you with a full description of its action and administration. Although it seems the simplest thing in the world to put a face-piece on your patient, and turn on the supply, (you have seen it done so often that surely, you will say, anyone can undertake such an easy matter) yet there are various minor details, involved in that process, and to which I would briefly draw your attention, which each and all add to the success of your administration.

For instance, you must arrange your prop so that it shall be secure against slipping, or time will be lost in inserting a gag, and as time is a very important element in all procedures under gas, this is an item not to be neglected. With regard to props, I much prefer to use a small one placed well back—quite out of the operator's way, and if it is necessary to extract on both sides of the mouth, a gag can readily be inserted on the side already cleared, without loss of time, as the mouth is already open. Then again, the face-piece should not merely be put on the face, but should be carefully placed and held in a definite way, with the air cushion inflated, so that it reach from the lower edge of the nasal bones to the groove in the chin above the mental process, and do not press it too firmly on. If you have an accurately fitting face-piece this will not be necessary to exclude air, and it is uncomfortable to your patient. Immediately your gag is adjusted to your satisfaction, apply the face-piece, and having assured your patient with a few encouraging words, and giving as little instruction as possible (as you will find that whatever you tell your subject to do, will generally be performed in a wholly different way to your expressed desires) commence the administration. You can imagine how disagreeable it must be to sit with your mouth wide open for even half a minute, whilst the anæsthetist is seeing if the apparatus is in working order, or the operator finds the very instrument he requires is sterilizing on the

kitchen fire. Everything must be ready before the prop is inserted.

Again, you should regulate the amount of pressure in the bag by the habit and condition of your patient. The big, burly, and muscular individual will require a considerable amount of pressure, and a constant free flow of gas to maintain that pressure, as a very small admixture of air will cause him to be excited, or boisterous and difficult to control and prolong the administration. Whereas children, weakly adults and anæmic young women, do not require so much gas, go under more easily and remain longer anæsthetic when a slight amount of air is mixed with the nitrous oxide. Then again, one often sees the face-piece held on with both hands, as if the administrator was engaged in a desperate feat of strength; one is all sufficient, the fourth finger resting on the mental process to support the lower jaw, to prevent it dropping, and the prop from slipping, and the other hand free to restrain any movements of the arms on the part of the patient. These are all minutiae but they help to make the administration pass off to the satisfaction of the operator, the patient and yourself. There are other points of greater importance, but I will not dwell upon them, as here you can daily see what is done, and can question the why and the wherefore. The art of giving nitrous oxide with perfect safety, ease and confidence can only be acquired by constant practice.

Gas is the anæsthetic *par excellence* for dental operations, and any other is only required in quite a small fraction of cases. When should we decline to employ it? I think we may say, that in no dental case, urgently requiring an extraction, but when from other conditions co-existent it is matter of some risk as to whether the patient can safely bear the shock, should we hesitate to administer gas, always provided that the operation is imperative, as the patient's risk is reduced to a much lower degree when the dread of the operation is

removed by the knowledge there will be no pain, and more so by the fact that the attendant depression is lessened by the absence of the pain and shock of the operation. Still in some cases nitrous oxide must only be used with great caution, and then not carried to deep anæsthesia, especially when the patient is labouring under respiratory difficulties or markedly feeble or irregular action of the heart.

Now the all-important question arises, what anæsthetic can we use with the greatest regard for the welfare of our patient and with the best advantage to the operator, when it is necessary to submit our patient to a more prolonged proceeding than can be undertaken with an administration of Gas. If it is only a series of extractions of ordinary difficulty to be dealt with, your best advice to your patient is to have as much as possible performed at a sitting under gas, and to return after an interval for further procedure, and so on until the jaw is cleared. This may involve more time and expense than some are able to afford. Then what is the next safest and best form of anæsthesia to employ?

Here a considerable difference of opinion arises between some of our Medical brethren north of the Tweed and their southern *confreres*. For whereas not a few of the most eminent teachers of the Scotch schools have very ably maintained the safety of chloroform, (and this has been still more insisted on recently by Surgeon-Colonel Laurie of the Indian Medical Service who has had an extremely large experience of it in Hyderabad). The anæsthetists in this country have mostly come to regard it as not quite an unmixed blessing, for such a lethal weapon to be used with the impunity it is, by many who have had but the smallest experience with it, to whom its stages are but slightly known and its indications of danger but faintly recognized. And if statistics and newspaper reports are to be relied upon (though I would not have you implicitly trust either) a very considerable number of

fatalities do occur annually during the administration of chloroform, even when in experienced hands, and quite half of these accidents happen to young and robust individuals, within five minutes of commencing inhalation with hardly any preliminary danger signals, and often for trivial operations which might well be performed with other and safer agents.

Therefore it seems to me that some more than exceptionally strong cause should arise before we are desired to incur even the small percentage of risk attendant on its use for such operations as we are chiefly concerned with in Dentistry. What then are the main conditions that may exist in our patients to compel us to resort to its use ?

(1) Any lung disease attended by profuse secretion and expectoration.

(2) Extreme fixation of the chest wall from well marked emphysema, or other cause.

(3) In the later stages of phthisis, when the breathing capacity is very limited, or in earlier stages if there is much tendency to hæmoptysis.

(4) Atheroma of the Arteries.

This list, I think, fairly covers the class of cases where chloroform will prove to be the only available anæsthetic in dental operations, and even in many of these a mixture such as the A. C. E. is often of equal service, and greater security.

What anæsthetic are we to employ if the operator requires several minutes for the completion of his task ?

To this I should unhesitatingly reply, Ether, in most cases beginning with gas, so as to produce unconsciousness rapidly, without the patient experiencing the unpleasant suffocative feeling, and strong irritating vapour of Ether. This can be done with great facility with one or other of the various forms of Gas and Ether apparatus now in general use, which are mainly modifications of the late Mr. Clover's admirable

inhaler, or of Ormsby's, of Dublin; the former being very efficient and exceedingly handy; although Mr. Woodhouse Braine, than whom we have no greater practical authority on anæsthetics, prefers Ormsby's inhaler for etherisation, preceded by nitrous oxide. In all these more extensive operations, the patients should be previously thoroughly prepared; no food or drink should be allowed for at least four hours before the appointment, and the clothes should be quite loose. As more or less shock and hæmorrhage will ensue, and some blood probably be swallowed, which will cause after sickness. I should advise you to perform these operations (if the patients are not in strong health or reside far from your own abode) in their own bedrooms, and when completed that they be gently lifted to bed, turned on the side with the head low, so that the blood may gravitate out of the mouth, and a reliable friend, or nurse, sit by to wipe the mouth clear of blood or vomited matter, until thoroughly restored to consciousness. Patients are apt to treat going to the dentist to have a few teeth extracted as a trivial matter, and this may be the case with Gas, but to many weakly and anæmic individuals to remove six to a dozen teeth at once, is quite equivalent to a surgical operation of considerable magnitude, for which they would make a much greater parade, and be quite prepared to rest for days afterwards, at the bidding of their medical attendant. Doubtless the preference given to chloroform by the majority of the medical profession, more especially by those who are not daily engaged in administering anæsthetics, is due to the facility with which it can be given, or as the late Dr. John Snow, one of the greatest pioneers in anæsthetic work, remarked, when asked why he used chloroform instead of ether, "For the same reason that I use a phosphorus match in place of the tinder box; an occasional risk never stands in the way of applicability."

Its requiring no special appliance, its lesser bulk, greater safety in the presence of artificial light, and the ease and readiness with which patients inhale it, are points in its favour. In the case of ether, unless the administrator has had considerable experience, even when gas is used as a preliminary, if the whole business is not worked *secundum artem*, difficulties are liable to arise, which, although not likely to prove serious to the subject, are disconcerting to the doctor. I will not weary you by dilating on these now. In giving anæsthetics, skill can only be acquired by practice, and you will, I hope never have to be responsible for the double duty of extracting and administering, but I will call your attention to the fact that you have a much wider margin of safety, and more reasonable hope of resuscitating your patient even when in *extremis* after an overdose of Ether, than is the case with Chloroform, that with the latter, dangerous symptoms are not nearly so evident, are very sudden in their advent, and that cardiac and respiratory movements often cease almost simultaneously.

In practice it must seldom be our lot in Dental Surgery to have to resort to any more hazardous anæsthetic than Ether. In the exceptional circumstances where chloroform is alone suitable, the very condition of the patient which necessitates its use, must demand our anxious care, and it will certainly be with something like a sigh of relief to all when the operation is successfully ended, and the patient safely restored to his friends.

Gentlemen, in this brief and hurriedly prepared sketch, I have expressed not only my own views on the subject, but those that, I believe, are held by the majority of the members of my profession in this country, who have devoted most of their time and attention to this speciality. Necessarily my paper is far from complete, for time would not permit, and I should only tire you more than I fear I have already done, where I to enter fully into this, to me, very interesting sub-

ject. Of its importance to human life, I need hardly speak. Can you imagine any more distressing event than for some little child, fair woman, or robust man, to enter your operating room full of life and hope, and a few minutes later to be removed a corpse? This is not a fanciful picture. I can well remember, and I dare say others here to-night can call to mind more than one such case happening within the last few years, but I do not wish you to take too gloomy a view of the responsibilities of anæsthesia. In the multitude of administrations of nitrous oxide, the fatalities are infinitesimal, and with our most dangerous substance, chloroform, deaths do not amount to more than about 1 in 3000 in all cases. Undoubtedly one of the highest achievements of the nineteenth century, and one of the most lasting, will be the discovery and practical application of anæsthetics, though we are very far from possessing a perfect agent suitable for all our work; we may, I think, look hopefully forward to the not very distant future, when such may be discovered, so that we may with still greater security combat pain.

A FEMALE DENTIST IN BOSNIA.—The Government of Bosnia has granted permission to Frau Emilie Edel to practise dentistry in any part of that country except in Serajevo, the capital, which is already, it is officially declared, “sufficiently supplied with dentists.” Frau Edel, who received her professional education in the Dental Institute of the Vienna University, proposes, it is stated, to settle in a town where the Mohammedan element predominates in the population.

British Journal of Dental Science.

LONDON, NOVEMBER 1, 1895.

THE DENSITY OF DENTINE.

Most dentists, we imagine, entertain the belief that "poor" teeth are deficient in lime salts, and those practitioners who have the time or inclination are in the habit of delivering little scientific discourses from that standpoint to the patient who asks "Why do teeth so easily decay." The use of whole-meal bread to provide the necessary lime; the avoidance of drinking water which is too "soft," the evil results of over-taxing the youthful brain and thus taking the phosphorus from the teeth; and, lastly, the disastrous effects of child-bearing, are all questions upon which dentists have had a good deal to say. Some of their most cherished ideas seem, however, in jeopardy if we are to accept the conclusions arrived at by Dr. BLACK, and based upon the facts presented by his admirable research, the details of which were recently published in the *Dental Cosmos*.

We have already drawn attention to the experiments as to the force exerted in the closure of the jaws, and as to the strength of the tooth as a whole, but some of the most interesting of Dr. BLACK's observations are those dealing with the Density of Dentine. Having first ascertained that the dentine of the crown of a tooth is generally heavier in proportion to its bulk, and more dense, than the dentine in the root, Dr. BLACK made his sections at the neck of the tooth. Large numbers were employed, and each piece of dentine was weighed four times, first under water, secondly, in the air; thirdly, after drying; and lastly, after calcination to ascertain the amount of lime salts. The description of the methods adopted to render all these delicate observations reliable, forms perhaps one of the most interesting

parts of Dr. BLACK's communication, but we must content ourselves by picking out from his tables a few of the more striking results. Nearly all the teeth used for the experiments were sent in by other dentists with a description of the patient from whom they were obtained. In certain cases under twenty-five years old, the figures show that the percentage of lime salts present in the "bad" was only .05 less than in the "good." In others over twenty-five and under forty years, the difference of .21 was actually in favour of the "bad"! When, however, we come to those over forty, we find again that the lime salts are slightly deficient in the "bad," viz., .16 per cent. The organic matter present varied in much the same way, and the general summary of results shows that in 103 perfect teeth the percentage of lime salts was 63.59, and of organic matter 25.36, whilst in 165 carious teeth the figures were 62.50 and 25.36 respectively. As Dr. BLACK says, there is a difference, but it is so slight as to be almost *nil*.

A peculiar feature of the statistics is a difference between the individual teeth of the same person even greater than the difference in averages of the teeth of different persons! The author also concludes that the specific gravity of a tooth does not wholly depend on the weight of the lime salts, and he regards the condition of organic matrix as a matter of importance. The figures also show that there is practically a continuous increase in the density of the teeth, and in the percentage of lime salts from youth to old age, and that in this respect teeth are similar to the bones. "These classifications, therefore, show conclusively that neither the density of the teeth, nor the percentage of lime salts they contain has anything to do with the liability of the teeth to suffer from caries." As Mr. TOMES suggests, the explanation may be found in some difference in the enamel, although he is inclined to concur with Dr. BLACK that it does not lie in the mere proportion of lime salts.

WHERE IS THE DENTIST?—"Viator" has "dropped into poetry" in the *Kidderminster Shuttle* upon the subject of "early closing." In his rhymes he upbraids the local chemists for not following the example of other tradesmen, and in endeavouring to anticipate a possible reply fires off the following :

"Oh," you say, "the public need us,
And we cannot go away;
When a man has got the toothache,
He *must* have relief *to-day*!"

He will not wait till to-morrow.

"Pain like that is hard to bear";
So is hunger; but the baker
Is not so consumed with care.

'Viator' is probably too gentle-minded to retaliate that people should keep their teeth in order by periodical visits to a dentist and that it serves them right to be reminded by a raging toothache of their neglect to do so. In the meantime what are our brethren in Kidderminster doing? Are they not to be found at the receipt of custom on an emergency, or do they also take half holidays with the baker unconsumed with care?

DENTAL RECRUITS.—According to *The Lancet* returns the following are entries of dental students for this year. The Dental Hospital of London 40, Guy's Hospital 32, The National Dental 20, Owens College Manchester 13, University College Liverpool 11, Mason College Birmingham 4, University College Bristol 1.

CLAUSE III OF THE DENTISTS' ACT.—We have before noticed the views held by *The Chemist and Druggist* as to the interpretation of the Dentists' Act. The following reply to a correspondent is perhaps rather more cautious than usual. "We do not ourselves consider that the description of your establishment as a "dental dépôt" is an infringement

of the Dentists' Act, nor do we believe any competent Court in the land would hold it to be so. But there are some curiously extravagant ideas about their rights held by certain dentists in official quarters, and we cannot, of course, guarantee that they may not some day test their views by an action." Our readers will doubtless remember the "Dentorium" prosecution, and will find a reference to it in the report of the meeting of the Unregistered Dental Practitioners' Association. There would seem to be as much difference between "Dental Dépôt" and "Dentorium" as between "Tweedledum" and "Tweedledee."

NATIONAL DENTAL HOSPITAL.—The annual dinner of the Past and Present Students will be held on Friday, the 22nd inst., at the Holborn Restaurant. Sir Dyce Duckworth, M.D., has kindly consented to preside. We are requested to say that any former student, who through inadvertance, does not receive a formal intimation, may obtain a ticket by writing to the Secretary at the Hospital.

DINNER TO MR. PEARSALL.—On the 9th October a dinner was given to Mr. W. Booth Pearsall, of Dublin, by several well known gentlemen of Chicago. Dr. Wassall presided, and the following were some of the gentlemen present:—Drs. A. W. Harlan, J. A. Swasey, Truman W. Brophy, W. V. B. Ames.

A dentist, of Liege, Belgium, while extracting a tooth for a patient, had his hand slightly scratched by the tooth. Inflammation followed, which, in time, extended to the shoulder, and the arm had to be amputated.

Reviews.

Dental Materia Medica and Therapeutics. By James Stocken, L.D.S. Eng. Fourth edition, revised by Leslie M. Stocken, L.R.C.S., M.R.C.P., L.D.S. Eng., and J. D. Butcher, L.D.S. Eng. London: H. K. Lewis, 1895.

It is nearly twenty years since the first edition of Mr. Stocken's "Dental Materia Medica" appeared as the outcome of a request from the Medical Staff of the National Dental Hospital, and we regret to learn from the preface to the present edition, that continued indisposition has obliged the author to place the work in the hands of his son and Mr. Butcher. These gentlemen appear to have revised the book thoroughly and successfully, bringing it up to date. The main body of the work of course consists of the description, preparation, and action of the various materia in any way useful to the dentist. There are also several pages of prescriptions under the headings of different diseased conditions.

The Diseases of Children's Teeth; their Prevention and Treatment. By R. Denison Pedley, M.R.C.S., L.D.S. Eng., F.R.C.S. Edin. London: Segg & Co., America: S. S. White. 1895.

This book is described as a Manual for Medical Practitioners and Students, and whilst admitting in the preface that the Student of Medicine has little time in which to take up optional subjects, the author has no difficulty in pointing out in the Introduction the importance of dental disease. From our point of view the responsibility of the medical man for his patient's teeth has been hitherto much overlooked, and the least he can do is to make himself acquainted with the main facts of dental pathology. Any medical man who will take the trouble to read the 160 pages of the book before us, will more readily recognise his responsibilities to patients, and be the better enabled to recommend the appropriate treatment. The facts set out as to the prevalence of disease in children's teeth, are in themselves a revelation, whilst the statistics from the Evelina Hospital, representing the co-existence of caries of the teeth in children with certain other diseases, are worthy of serious consideration.

We do not remember to have met with elsewhere a similar attempt to show that carious teeth are more prevalent among sick children than among those who are healthy. The author admits that the results of his examination of such children do not constitute a distinct proof of a connection between dental and other diseases as cause and effect, but he is of opinion that "there is strong reason to suspect, and even to believe, that many of the diseases of the nervous system, diseases of the respiratory organs, diseases of the alimentary canal may be due, in some cases directly, in others indirectly, to the fact that the masticatory organs have been neglected." We imagine it is to the figures collected at the Evelina Hospital that the author refers when in his preface he hopes that some information in his book may be found useful to dentists, and the cases of diarrhœa and sapræmia reported by Dr. Wainwright as well as those of chorea by Mr. Senior are interesting to both doctors and dentists.

Chapter I gives an outline of the structure of the dental tissues. The explanation of the diagram, by the by, contains what is evidently a printer's error; the organic matter in dentine is generally stated as being 28 per cent, not 18. Then follow chapters on Eruption, Caries, Pulpitis and Alveolar Abscess. Chapter VI is a condensed account of Irregularities and Overcrowding, and the next, perhaps the most important in the book, deals with the hygiene of the Mouth. It is here that we find the figures and cases above referred to. In the concluding chapter the author has endeavoured to show how medical men when beyond the reach of a dentist's skilled aid, or in other emergencies, may do something to relieve pain, and even to "stop" a carious cavity. There are also directions for the extraction of teeth.

Naturally the author does not deal very fully with some of the questions of treatment discussed amongst dentists; we notice however, that he is sound on the question of symmetrical extraction. He has evidently attempted rather to define some broad rules for the guidance of medical men, and we do not stop to criticize too severely. We welcome the book as an attempt to educate doctors in the elements of dentistry, and the importance of oral hygiene, believing that, indirectly the Public will be benefited by such an advance in knowledge. The book is illustrated by 99 figures and diagrams, the large majority of which are original.

Abstracts of British & Foreign Journals.

A CASE OF FOREIGN BODY IMPACTED FOR FORTY-SIX DAYS IN THE LEFT BRONCHUS ; OPERATION ; RECOVERY.

By JOHN H. MORGAN, F.R.C.S. Eng.

The right bronchus is somewhat the larger of the two, and the septum at the subdivision of the trachea is slightly to the left of the median line, and thus is explained the fact that foreign bodies more frequently pass into the right than into the left division of the trachea.

A healthy girl aged eight years and nine months was admitted under the care of Dr. Mitchell Bruce on Sept. 25th. 1894. Three weeks previously, whilst sucking a plum-stone, which she had previously cracked, a portion of the stone fell back and, as was supposed, was swallowed. Immediately she complained of pain in her neck, and she was given a crust of bread with a view of removing it. Next day she was seen by a medical man who gave her some medicine and stood her on her head in hope of dislodging the stone. This is not a form of treatment which I should advise you to follow in similar cases unless you are perfectly prepared with all the apparatus necessary for tracheotomy. At that time, and since, she is stated to have complained of pain on the right side of the heart. Poultices were applied and constantly renewed with a view to relieve the pain, and the child was kept in bed for three weeks, during which time she took very little food. She was unable to sit up, but slept well, except when the cough troubled her, which it usually did about 4 a.m.

On admission she appeared fairly well nourished. The temperature was 99.6 deg. F. She had slight paroxysms of coughing both day and night. The left side of the chest was flattened, chiefly over the second and fifth ribs, and the movements of this side of the chest were deficient, the interspaces being sucked in during inspiration. Vocal fremitus was greatly diminished, especially below the level of the third rib. The apex was felt in the fifth interspace half an inch external to the nipple. The whole of the left side of the chest was dull excepting over the left of the sternum, and this dulness extended over the whole of the left lung posteriorly. The right side was hyper-resonant.

On auscultation some breath sounds were heard under the left clavicle which were lost about the third interspace, and some feeble breath sounds were audible behind in the supra-scapular region, below which all was dull.

On Oct. 4th, after consultation, it was decided to attempt the removal of the foreign body by operation. The patient, after struggling violently without ill effect, was anæsthetised with chloroform. The colour and breathing were good. Mr. Waterhouse made an incision in the mid-line from the cricoid cartilage down almost to the interclavicular notch. The trachea was exposed and a scalpel passed through between the third and fourth rings from below upwards well below the level of the isthmus. No mucus escaped, but a small amount of blood which entered the opening was expelled.

In spite of the inversion of the patient, with rigorous stimulus to the back, the obstructing body remained *in situ*. A bent wire, with looped extremity downwards, was passed down the left bronchus, but without at first discovering any obstacle to its further passage. A double looped strand of silver wire was then passed, with the result that the object sought was distinctly felt.

On each of several attempts muco-purulent secretion was brought away on the instrument, and a small quantity was expelled through the opening after each trial. On attempting to pass the little finger the child became distressed, the veins of the neck becoming distended and turgescient.

The child was allowed to partially recover consciousness and the laryngeal reflex was then excited with a feather. The breathing became spasmodic and violent, but without the effect of expelling the foreign body. At no time during the operation was the child greatly distressed.

A large oval tracheotomy tube was tied with tapes, and horsehair stitches above and below drew the skin incision together. During the ensuing night the child was in some distress, but she was relieved on substituting a Parker's tube which was removed at intervals, but did not become clogged with mucus. During the next few days there was a good deal of cough and mucous expectoration mixed with some greenish yellow pus, but in no great quantity.

I saw the child in consultation with Dr. Bruce and Mr. Waterhouse. and it was decided to defer further treatment until the signs of bronchitis had subsided.

On Oct. 19th the child seemed in a favourable condition for further proceedings. Chloroform and afterwards ether were

administered. Inversion was first tried and cough was then excited by a feather passed down the trachea, but no effect was produced upon the position of the foreign body. A long probe, slightly bent, was then passed down the left bronchus, and a hard substance was distinctly felt at a distance of about five inches and a half from the lower margin of the tracheotomy wound. The wound was then held open by retractors and a long pair of forceps, curved for the last inch of their length, was passed down the left bronchus, but the contact of the retractors making it difficult to be sure of the causation of any foreign body these were removed, and on again carefully introducing the forceps the hard substance was felt, the forceps carefully opened and closed, with the result that the foreign body was at once withdrawn through the wound. This was found to be a part (nearly half) of an irregularly broken plum-stone, which had been impacted with its apex downwards, and had been seized by the edge of the broader broken surface. The wound was left with only a guard wetted with carbolic lotion.

During the following night there was but little cough, but a considerable quantity of sero-sanguineous fluid escaped from the edges of the wound. This continued for a day or two, but gradually diminished and very shortly ceased and the wound [closed. The temperature never rose above the normal.

From experiments kindly made by Dr. Batten, registrar to the Hospital for Sick Children, Great Ormond-street, on the cadaver of a child about the same age and height, it appeared that the body must have lodged, just as described in the case reported by Dr. Cheadle and Mr. T. Smith, at that portion of the left bronchus where it bifurcates into its two main divisions and below the branch which passes to the upper portion of the left lung, and the surgical aspects of this case are almost identical with the one described by them except for the very much longer period during which the lung had been obstructed.

In their case the operation was performed on the eighteenth day and in the case now described on the forty-sixth day after impaction, the ages of the two children being nearly identical and their recovery being equally complete and satisfactory.

This is by no means the least interesting feature of the case.

How to explain the circumstance that a large proportion of the right lung can remain for so long a period inert and entirely or almost entirely deprived of all functional activity, and then resume its functions apparently without drawback, are questions which must be left for a physiologist to solve.

The Lancet.

COAGULANTS AND NON-COAGULANTS.

By Dr. A. W. HARLAN.

As long ago as 1880 my attention was called to the indiscriminate use of the prominent coagulators of albumin—viz, chloride of zinc, carbolic acid, and wood creasote, and incidentally to aromatic sulphuric acid. I had found, by clinical experience, that many pulpless teeth after being dressed and soaked for days and weeks with the above-mentioned agents, and the roots afterwards filled more or less completely, gave their possessors much trouble. In some cases, where small portions of the pulp had been allowed to remain under root-fillings, either a blind or fistulous abscess was developed. I came to the conclusion that this might have been brought about through the superficial coagulation of non-vital portions of such pulps and the direct coagulation of the exposed inner surface of the animal matrix and contents of the dentine tubes of the tooth. (Infective matter, ptomaines, and cadaveric alkaloids by such superficial coagulation were sealed in the dentine, and afterward the cementum and pericementum were affected by the presence of such *materies morbi*, so as to produce intermittent spasms of irritation, which later produced protrusion of the tooth from its socket, rendering it useless for mastication.) When it is remembered that the glue-yielding portion of the tooth is impregnated with water to the extent of about ten per cent. of the bulk of a whole tooth, and that something like thirty per cent. is organic matter beside, I naturally concluded that there was something radically wrong in the then methods of pulp-canal treatment and sterilization by the use of coagulants. I had, as early as 1874, tried a series of experiments in staining

dentine and cementum with various colouring matters,—carmine, silver nitrate and others,—by first sealing the apical end of a root with wax and paraffin, then placing a drop of alcohol—a coagulant—in the pulp-chamber and canal, and immuring the root in the staining fluid. I found, then, in these experiments, that I was unable to observe the colouring matter pass through the peridental membrane, cementum, and dentine, so as to contaminate the alcohol in the central chamber of the tooth. By reversing those procedures, placing the staining liquid in the pulp-canal and the alcohol on the outside of the tooth, I could not succeed in making the liquids intermingle. Subsequent cuttings for microscopical use failed, in all cases, to show that the alcohol had ever passed beyond the superficial portion which it coagulated. In these experiments I used freshly extracted teeth, and carefully sealed the entrance to the pulp-chamber so that the alcohol would not evaporate. Alcohol is a coagulator of albumin, pure and simple, and when it is largely in excess the coagulum is redissolved as a rule. This, however, is not the case with serum-albumin, in experiments out of the mouth or in the mouth. Example: If a half-drop of freshly-extracted blood-serum is introduced into a pulpless tooth in the mouth with the apical end sealed hermetically, and absolute alcohol is applied to it to coagulate it, and afterward a mat of porous paper soaked in alcohol is placed over the coagulum, and the cavity is sealed with melted paraffin and the whole allowed to remain for a few hours, the coagulum will not be found dissolved. (It is not very easy to perform experiments of this nature.) Even after twenty-four hours the coagulum remains the same in appearance. Contamination from the fluids of the mouth can be prevented by the adjustment of the rubber-dam over the single tooth and gluing it with carbon bisulphide, or by slipping a rubber cap over the dried tooth, moistening the surface with carbon bisulphide and tying it securely with waxed silk. Coagulation with alcohol does not produce a chemical change. From the period mentioned until 1881, I was not able to use other than so-called coagulating agents, simply following the usual routine. About 1874 or 1875 carvacrol and thymol came into use in dental practice, but neither of these agents were largely used. Carvacrol is a very slight coagulator of albumen, but it will be diffused through the moist dentine in from ten to fourteen hours. Thymol is not a coagulator of

albumin ; it will diffuse through moist dentine in from three to six hours at 98.4° F.

I was not able to discover satisfactory agents as disinfectants until the year 1881, when my first paper on essential oils and H^2O^2 was published in the *Dental Register* for December of that year.

Last year Dr. Kirk, averred that all my previous papers were based on an assumption, and that I was the originator or chief exponent of the assumption. Let us examine some of his work to verify or disprove such characterization. The author of the paper, "On Coagulants in the Treatment of Pulp-Chambers and Canals," departed from his title and limited his observations, first to : "Do coagulant antiseptics produce with albuminous matter a coagulum which is a barrier to the further diffusion of the coagulant or other medicaments?" And second, "Or, as has been asserted, are coagulants self-limiting?" And third: "Do coagulants prevent diffusion of antiseptics in the treatment of pulpless teeth.

From a reading of the title of the paper one would conclude that the whole subject was to have been handled exhaustively. Such, however, was not the case. It was simply a theoretical question in physics. The author of the paper endeavours to prove that coagulating agents in pulpless teeth are not self-limiting. He goes so far as to say from some experiments (inconclusive) that coagulators of albumin are diffusible. As Dunglison is accepted as authority on definitions, we will see what he says on diffuse : "Diffuse, to spread over a surface or through a mass either by the production of greater tenuity in matter, or by dissemination with force, as with electricity." "Diffusible, *diffundo*, to pour, to pour apart or abroad." "Diffusion liquid, inter-mixing of fluids or solutions with each other directly." Three agents, commonly known as coagulators, were used in the author's experiments,—zinc chloride, carbolic acid, and corrosive sublimate. There is no report on the action of carbolic acid as a diffusible agent, hence we must conclude that the author was not satisfied with *its* diffusibility through dentine or in egg-albumen. (As a matter of fact, if a five per cent. solution of carbolic acid is poured gently into a tube containing egg-albumen, and the tube is stopped with absorbent cotton to exclude the air and moisture, it will be found that only a superficial film of carbolate of albumin is to be found on the surface of the egg-albumen." This is explained

in this manner: As long as the carbolic acid in solution exerts its affinity for water we will have a carbolate formed; when this ceases, its action is ended. There is no diffusion beyond the concreted, filmal surface in contact with the deeper portion of the albumen. Melted carbolic acid when brought in contact with egg-albumen only exerts a more powerful action in consequence of its greater avidity for water, and in no case is it diffused over or through or across the bulk of egg-albumen with which it is brought in contact). The report on zinc chloride is likewise inconclusive, as no test was made to show that it could be recovered from the so-called coagulum around the root of the tooth through which it was assumed to pass. The report on sublimate, which demonstrated its passage through the tooth-root into the iodide solution, is the only conclusive experiment reported. *It* was demonstrated after three days. As corrosive sublimate is not a coagulator of serum albumin, but simply a precipitant, it need not at this time further engage our attention. Globulin, which is found in the animal tissue in abundance, is a coagulable material; unlike serum-albumin, it is not precipitated by HgCl_2 . A special pleading such as was indulged in by the author (see *Dental Cosmos*, March, 1894, page 181), not being written or presented in a spirit to instruct, fails in its ultimate object, unless something can be deduced that will give us a rational basis for practice. The history of osmosis is discussed in a grave and reverential manner to produce the impression that its discussion will, in some remote manner, fix on the mind of the auditor that the processes of diffusion and coagulation are analogous to it. We are not to be blinded by such sophistry. The conditions surrounding a root of a tooth implanted in its socket are so dissimilar that there can be no comparison between the action of a coagulator of albumin in such a situation and the one where a tooth is suspended in egg-albumen. In the former case, the root is covered with a membrane (peridental). There is a definite quantity of moisture and animal heat. In the latter we have no record of temperature, but we have a positive record of the imbibition by the tooth of boroglyceride to saturation (in which menstruum, zinc chloride, carbolic acid, and corrosive sublimate all are soluble). The inhibition of diffusion under such circumstances is practically *nil* when a tooth so treated is suspended in egg-albumen placed in a test-tube. It will be found that so long as zinc chloride will find water to further dilute it, so long will we find coagula

tion, and no longer. Is this diffusion according to the best definition we now have? The above is true of carbolic acid, but we find that very soon the coagulation ceases; as the affinity which zinc chloride has for water is so much greater than that of carbolic acid, the action is not so pronounced.

The coagulation produced by the author of the paper is nothing more, nothing less, than the satisfaction of the affinities of such drugs for water, there being no true diffusion of the drugs in either of his experiments. Zinc chloride liquefied, which is a powerful irritant and destroyer of tissue, is classed as a coagulator of albumin, when as a matter of fact, it is an escharotic and charrer of animal tissue. Dilute solutions of zinc chloride are coagulators of albumin, egg-albumen, but such solutions do not diffuse through it. This may be proved in many ways. It does not enter the circulation when applied locally in solution or undiluted. It does not spread and permeate the soft tissues; but on the contrary, it passes in a straight direction from the surface to which it is applied until a sufficient coagulum is produced to prevent its further entrance into the soft tissues. It does not diffuse any farther or it would be found in the circulation. It does not mummify when used in full strength. The so-called hyaline coagulum (Atkinson) is nothing more than an atrophied pulp protected from destruction by anaërobic microbes, by an abnormal growth of the peridental membrane over the apex of the root. When zinc chloride comes in contact with serum-albumin, it is destroyed, disintegrated, rendered unfit for food, save for pathogenic micro-organisms (Sternberg). Its action is always local; it does not permeate deeply. If you plant a freshly extracted tooth in plaster of Paris, having sealed the apical end, leaving the pulp *in situ* and apply liquefied zinc chloride, or fifty per cent. zinc chloride, or twenty per cent. first, you cannot detect it in the plaster of Paris; second, it is not to be found in the cementum or peridental membrane; third, the coagulation of the animal matrix of the tooth leading from the pulp-canal is most superficial. The contents of the tubes do not show under the microscope the characteristic hardening that we find in the use of other agents when the whole tooth is prepared by processes not analogous to Weil's method. (Teeth containing fresh pulps were treated with zinc chloride for four months, and even then it was impossible to discover that the slightest trace of zinc had passed through the sides of the

root or even the apex, when the only barrier was the naturally fitted pulp, the body of which was considerably shrivelled but not wholly hardened after such prolonged exposure.

It is hardly necessary to say much of corrosive sublimate in this connection, but I will say this : When poisoning takes place with HgCl_2 , the antidote is egg-albumen. If it is a diffusible agent through tooth structures, why does it not diffuse through the walls of the tooth and produce toxic symptoms? When it is brought in contact with a Herbst pulp-stump, why is it not diffused through the remainder, producing the train of symptoms that mercury is known to produce? As soon as the albuminate of mercury is produced in the stomach, the patient is free from further danger. The reason why large doses of sublimate seldom produce death is that the comparative insolubility of HgCl_2 in water, sixteen to one, produces, first, filmal precipitation of albumen, and second, nausea, which expels the whole mass from the stomach. The administration of white of egg produces the insoluble albuminate of mercury, which is inert, and the patient lives. If, after the albuminate is formed, diffusion took place, manifestly egg-albumen would not be a safe antidote for poisoning by corrosive sublimate. But it is. Workers in bacteriology found that corrosive sublimate was not a good disinfectant, because it precipitated albumin and prevented its further penetration of soft tissues ; hence the addition of hydrochloric acid or tartaric acid to prevent such precipitation. If you take an elbow test-tube and fill it nearly full of beef broth (sterilized) and add a saturated solution of corrosive sublimate to one end and protect the other with cotton wool, the sublimate will not prevent a growth of organisms under the cotton wool, but at the other end no growth takes place. If it is diffusible through albumin, why does it not diffuse through the broth and keep the whole contents sterile?

The writer deems it a necessity to present this paper to refute the erroneous impressions left last year by the reading of the paper, "On Coagulants in the Treatment of the Pulp-Chamber and Canals"; he feels that its teachings were so opposed to the facts of pure science that it was a public duty. He also regrets that it was impossible to cover the whole subject of coagulants and non-coagulants, with a practical lesson ; but his previous papers must suffice to stimulate the

earnest searcher after truth to a re-perusal of them to refresh his memory on this intensely practical subject.

To recapitulate the essence of this paper, I have prepared the following conclusions :

First. True coagulators of serum-albumin are not diffusible when brought in contact with it in a tooth-root.

Second. Coagulators of the organic matrix of a tooth-root, tube contents (dentine), by the concretions of such albuminous matter prevent the further entrance of such coagulators as soon as their affinity for water is satisfied.

Third. The destruction of a coagulum in such situations being a foregone conclusion through the agency of anaërobic microbes, brings about a chemical change in a coagulant antiseptic which deprives it of the coagulant property ; hence it passes into the circulation, and is excreted as other foreign inert bodies are discharged from different channels.

Fourth. The addition of boroglyceride to a coagulant in definite proportions so alters it that it no longer acts as a coagulant ; hence it is possible for it to pass through tooth-structure and be recovered from the liquid media surrounding a tooth, when its coagulating property will be restored.

Fifth. Non-coagulants soluble in water diffuse readily through tooth-structure, as has been shown repeatedly in experiments out of the mouth, not only in egg-albumen, but likewise in serum-albumin.

Sixth. Oleaginous non-coagulants pass through the structure of a tooth quite slowly in the presence of water in serum-albumin, and oils pass through filtering solutions, showing that they displace water. The vaporizable portion of an essential oil will give to a substance which it permeates the characteristic odour in from three to six hours (Watts).

Seventh. A non-coagulant disinfectant destroys developed and deprives the spores of anaërobic pathogenic microbes of the power to be developed ; and, as it does not coagulate albumin, it does not prepare a food for the sustenance of any accidental ingress of such developed organisms ; hence the future of such teeth treated by non-coagulants is infinitely preferable to the conditions surrounding those treated by coagulants.

Eighth. A non-coagulant disinfectant completely sterilizes infected dentine by virtue of its diffusibility through it, while a coagulant either precipitates an insoluble barrier or so concretes the albuminous matter with which it comes in contact that it cannot act as a perfect sterilizer, but effectually

seals infectious and poisonous matters in the dentine, which ultimately have their exit through the cementum and pericementum, depriving both structures of needed vitality.

The Dental Cosmos.

SUGGESTIONS ON CROWN AND BRIDGE WORK.

By FREDERICK B. KREMER, D.D.S., Minneapolis, Minn.

Some one has said that we may learn more from our failures than from our successes. Thought and observation lead to the conclusion that the father of that idea was, undoubtedly, a member of our craft, for who has had a better chance to learn the true meaning of the word *failure* from personal experience, than the progressive dentists of the last two decades? The reason for so many failures, lies, of course, in the fact that our profession is young, and is, in its present state, the outgrowth of an emulation and enthusiasm that has caused men engaged in its practice to attempt operations that without this stimulus, would never have been undertaken. Naturally this desire to progress and excel has led us into unknown fields, and many have paid the penalty of their ambitions by costly failures. In no branch of dentistry has this been more marked than in the field of crown and bridge work. There has been offered a seemingly unlimited scope for the exercise of ingenuity and skill. For a time it became a "fad" and bridges were builded of alarming size and grotesque design. The essayist pleads guilty to having, in the days of his enthusiasm, put the work of fourteen teeth upon five in a number of instances with the result of having been obliged in over half the cases, to add to the records of the operations the word *failure*.

Had he been possessed of that judgment begotten of experience he would have inserted in those cases, removable bridge work instead of fixed bridges, in which event success instead of failure would have closed the record.

At the present time, in my practice, six teeth including

piers, is the limit of a fixed bridge, and then only in cases where I have a normal occlusion and a depth of space sufficient to enable me to make the bridge easily and thoroughly self-cleaning. By depth of space I mean cases in which either the crowns of the remaining teeth are long, or absorption after extraction has been sufficient to enable me make the dummy teeth strong enough to bear the strain of mastication and long enough that they may present lingually a continuous oval surface to which food cannot cling, or between which and the gums food cannot become impacted. In cases where the crowns of remaining teeth are short, much abraded and in square bites a fixed bridge is usually a failure after a few years use owing to the difficulty in such cases of securing proper self-cleansing spaces, and at the same time the requisite strength for purposes of mastication. In all such cases a removable bridge is preferable, using telescope crowns made of gold alloyed with platinum or iridium, thus securing the maximum strength with the smallest amount of material. A removable bridge is not only indicated in the class of cases just mentioned, but also in all cases where the teeth are not firmly articulated, or where there is much deviation from a normal occlusion.

In the class of cases last mentioned the danger of fracture of porcelain facings is greatly increased and knowing the difficulty of repair it is best to have a denture that can be removed from the mouth in case of accident. In almost any case a removable bridge is preferable in the end to a fixed bridge. It is true that a much higher degree of skill is necessary in the construction of removable bridge work to secure successful results than in fixed bridge work but not so high as to be unattainable. The breaking of porcelain in fixed bridge work, even where the occlusal surfaces have seemingly been thoroughly protected with gold, has been a source of much annoyance, and many directions for repairing the damage have been given. Little, however, has been said along the line of prevention. I think I can make two suggestions that will be of value to you. One is old, the other so far as I know is new, or at least not in common use.

The old idea is the use of removable porcelain facings. They answer the purpose very satisfactorily and should be more generally adopted in practice. I have had one case in hard use for nearly two years and it is bearing the stress admirably. The other idea, the new one, is I believe a cure

for the evil because it reaches the cause of our trouble, namely, imperfect articulation. Seldom have I seen a case of bridge work where a proper articulation had been secured. A lateral movement of the jaw with correct articulation is an impossibility in plate work without the use of a Bonwill articulator. This knowledge caused me to look into the question of breakage in bridge work from the standpoint of articulation and the result of my investigation was truly surprising. So much so, in fact, that I am almost prepared to say without reservation, that metallic occluding surfaces are not a necessity in the molar and bicuspid teeth, provided a proper occlusion has been secured by the application of Bonwill's law of occlusion to the construction of bridge denture. At the present and for some time past, I have been following the suggestion I have just given with the most gratifying results. It may at first seem somewhat difficult to grind the dummy teeth to meet the requirements of this law but it can be easily accomplished after a little practice.

Another of my early troubles was caused by the failure of shell crowns used as anchorages to stand the stress brought to bear upon them. They would sometimes be torn or broken down where the bridge was soldered to them. I have entirely overcome that annoyance by doubling the band half way around on that side. After making the crown and fitting it to the tooth or root I bend a strip of gold of a width equal to that of the band and reaching partly up over the occlusal surface soldering it to the crown, thus securing two thicknesses of metal instead of one where strength is most needed.

It should be unnecessary at this late day to say anything about root preparation; but from an improper understanding of the necessity for thoroughness in this stage of the operation more failures result than from any other one cause. As to the principles involved I claim no originality, as they have long since been a matter of record.

The crowns of all teeth are cones, with the base at occlusal or incisal surface and the apex at the gum line. A study of the relation of the enamel to the dentine, would convince any one not wilfully obtuse, of the impossibility of making a band passed over the base of the cone fit at the apex or gingival portion of the tooth, and yet, I have heard a teacher of crown and bridge work, talk by the hour to show that it was the easiest thing in the world to do.

A study of the appearance of a molar tooth after the removal

of the enamel will show us that the cone still exists, but the removal of the enamel has caused a reversion of the relations of the base and the apex. We now have the base of the cone at the gingival line. In other words the largest diameter of the tooth is now at the gingival portion and a band made from a measurement taken two-thirds of the distance from the occlusal surface toward the gum line and then driven to place must fit absolutely at the gingival line. The only way in which a band can be accurately fitted is by the complete removal of the enamel and this should always be done even though you have to devitalize the tooth in order that you may accomplish it.

We all like to make ideal crowns, and we all would make ideal crowns if we always had ideal cases. Unfortunately, or otherwise, we rarely have the opportunity. By the time the case reaches us, the teeth on either side of the root to be crowned have usually changed position, so that the space to be filled is not the shape that it originally was. It has been the custom to bestow a great deal of labour upon the occlusal surfaces of these crowns with a view to having them appear as presentable as possible. This would be perfectly proper if it was not done at the expense of a far more important part of the operation, namely, the shape of the band with reference to proper points of contact and the shaping of the interproximate spaces. We all admit the importance of these points in making contour fillings, yet I fear we are all somewhat careless at times of these principles in making crowns, where their observance is, if anything, more necessary than in fillings. Look to the contour of your crowns first, and then get as good an occlusal surface as you can, being assured of the fact that the best rule to follow in any operation is, utility first and beauty afterward.

The Dental Review.

REPLANTATION.

Mr. H. T. Butlin made the following interesting remarks in describing a successful case of trephining the skull. "I have never been able to explain to myself how it is that great pieces of bone put into a solution of boracic acid should so readily reunite when put back. It is a very different thing from skin-grafting, where one leaves broad flaps of skin to

carry on the nutrition of the transplanted portion. Moreover the portions of skin thus transported are very thin indeed, and consist of little more than the epidermis. Here on the contrary you have a very thick piece of tissue put aside for half-an-hour or so, then put back in place; yet it lives, contracts a new attachment to the surrounding parts, and really acquires such strong attachments that at the end of two or three weeks it is very difficult to remove, as Mr. Lockwood found.

The only examples I can recall of similar conditions are in respect of teeth which have been replaced. My attention was called to that matter many years ago, because when a boy I remember that my father had a sound tooth pulled out by mistake. The dentist replaced it but it gave rise to a good deal of pain, and a week later it had to be removed, this time with much more difficulty than on the first occasion. I once had to remove an epulis from the gum of a girl, and to do so thoroughly it was necessary to remove the tooth from around which it sprang. I scraped the tooth well and then put it back, and it promptly grew as firmly fixed as before. I suppose that bone being a slow growing tissue is also slow to die, and that under circumstances not too unfavourable, it is capable of taking on a fresh lease of life."

Mercury precipitates Platinum when agitated with a solution of a platinum salt. E. Sonstadt (*Journ. Chem. Soc.*) states that a solution of 1 part of potassium platino-chloride in 3,000,000 parts of water may be distinguished from pure water by the test, provided the mercury to be quite pure.

Reports of Societies.

NATIONAL DENTAL HOSPITAL STUDENTS' SOCIETY.

A meeting of this Society was held on Friday, Oct. 11th, at 8 o'clock. The President, Mr. Alfred Smith, in the chair.

The minutes of the previous meeting were read and confirmed, and the usual welcome was given to visitors present.

The following gentlemen were proposed as members of the Society, to be balloted for at the next meeting, (Nov. 1st):—Messrs. Riches, Poundall, Hulme, Lane, Pearse, Lindeboom, W. Read, Thomas, Devonshire, Tattersall, Storey, Tilley, Wing, Round, Gudgeon.

Upon Casual Communications being called for, Mr. L. H. CANTON brought forward a patient, a girl of 14, showing an interesting condition of the upper incisors. Both centrals were geminated with what were supposed to be laterals, but which might have been supernumeraries, as there was on the right side, within the arch, a tooth which had all the appearance of a lateral; on the left side, in the canine region, was a tooth which was too much affected by caries to determine its original form. Both examples of gemination were carious, and each appeared to be possessed of one common pulp chamber.

Mr. SPOKES showed a model from a patient who had since undergone an operation involving the removal of both the superior maxillæ, for an extensive malignant tumour; the deformity produced was very great. Mr. Spokes also showed some specimens illustrating cases of immediate regulation.

Mr. FARMER sent a right upper wisdom tooth of a patient æt. 54, to which were fused the three roots of the second molar.

Mr. MOORE exhibited models of a severe case of lack of anterior occlusion, the first and second molars only articulating. The patient, a lad of 15, had most irregular teeth in the upper jaw, the temporary canines and molars being retained, thus forming a "double row," and one lateral being in the arch and the other without.

Mr. JONES showed a photo-micrograph of dentine of a peculiar structure, and also exhibited two abnormal teeth, one being a lower molar with three very well marked roots, and the other a lower wisdom tooth, having the root greatly curved.

Mr. EVERITT brought forward a pair of upper centrals extracted from a patient, aged 45, showing remarkable evidence of intermittent calcification. The teeth appeared as though they had been carved into superimposed rings, and afterwards polished.

In the discussion following the Casual Communications:—

Mr. OGLE explained a method of treating nasal growths which did not necessitate the removal of the entire maxilla, but merely division along the palate which was closed up again.

Mr. ALFRED SMITH described a case occurring in his own experience, of the satisfactory replacement of the maxilla with a vulcanite appliance.

The President then called upon Mr. Ogle for his paper on "Anæsthetics" which is published on page 974.

In the discussion which followed

Mr. ETHERIDGE asked Mr. Ogle how long the patient should abstain from food before the administration of N_2O gas.

Mr. SPOKES thought that although modern students had such good opportunities for learning how to administer anæsthetics, it was always the best plan to call in a special anæsthetist, so that there might be an operator and administrator. He was of the opinion that N_2O was neglected more than it should be for use during many minor operations, and mentioned the successful use of the gas for cases of trachoma of the eyelids. In conclusion he should like to ask Mr. Ogle what was the longest time that he had kept a patient under the influence of N_2O gas.

The President mentioned some cases he had seen of accidents with the prop. In each case a front tooth was pushed out of its socket, and after replacement became firm. He thought that when the patient was known, excitement during N_2O narcosis could be modified by previously treating the patient with some form of bromide. Mr. Smith also described an operation on the thyroid body which he had witnessed, the anæsthesia, which lasted about five minutes, was produced by N_2O .

Mr. ETHERIDGE also asked Mr. Ogle what was his experience of nitrous oxide gas with oxygen and N_2O with the addition of atmospheric air.

Mr. OGLE, in replying to the various questions, said that it was better that the patient's stomach should have but little food in it, for any kind of anæsthesia; about 4 hours generally gave the best results. He had not a very high opinion of N_2O+O because the after effects were as a rule more marked. He thought that it was advisable to admit a little air with the gas to some patients in order to induce longer anæsthesia

and less spasmodic action. He had administered "gas" for an operation lasting for 20 minutes. He always preferred, when possible, to use a side prop rather than one in the front of the mouth. In conclusion Mr. Ogle said that the idea of using bromides for excitable patients was very good.

The PRESIDENT then called upon the meeting for a vote of thanks to Mr. Ogle for his excellent paper and to those gentlemen who had brought forward Casual Communications, and this having been done the meeting adjourned.

Dental News.

STEALING A DENTIST'S SHOW CASE.

Charles Cialis, aged 18, described as a labourer, was indicted at the County of London Sessions, Clerkenwell, for receiving a case of false teeth, well knowing same to have been stolen. The prosecutor, carrying on business in Edgware Road, stated that on September 28th last a case containing artificial sets of teeth was placed inside the doorway of his premises, and the same evening it was stolen, and only the empty case had been recovered.

The prisoner was on Tuesday last sent to gaol for 12 months, with hard labour.

THE UNREGISTERED DENTAL PRACTITIONERS' ASSOCIATION.

A public meeting of dentists has been held in Glasgow, under the auspices of the Unregistered Dental Practitioners' Association of Great Britain, for the purpose of establishing an affiliated centre for Scotland. Mr. Fred Butterfield, of Oldham, with Mr. J. R. Taylor, of Bacup, comprised a deputation from England, and Mr. Butterfield presided.

The Chairman stated that the Association was formed to enable *bona fide* practitioners and men capable of doing their work to practise their profession independently and without fear of prosecution. He contended that some of the registered men, were quite ignorant of the mechanical portion of their profession. This association was founded in September, 1894, with a membership of 17, and had now 120 names on the roll. The balance at present to their credit amounted to £194 12s. 6d.

Mr. J. R. Taylor, the treasurer, spoke briefly of the position, enemies, and means of defence. In Lancashire, he said, the unregistered men would be treated as outcasts, were they not able to stand their own ground. The B.D.A. had successfully carried on prosecutions against unregistered men for using the words appertaining to the word "dentist." Mr. McDonald, of Manchester, had been recently prosecuted for using the word "dentorium," and lost the case, having to pay a penalty and costs amounting to nearly £200. He cautioned his hearers to be extremely careful in their methods of advertising, and to abstain from using words such as "dental," "dental surgery," "dentorium," and others that would bring them within the scope of the Act of 1878. Anyone becoming a member of the Defence Association, and advertising in words sanctioned by the Defence Association Council would be upheld by that Association in any prosecution that might arise. He alluded also to the non-success of the B.D.A., in attempting to have unregistered practitioners prohibited from using nitrous oxide or anæsthetics.

On questions being invited, it was asked of the chairman could a man, employed in a druggist's shop and practising dentistry on a small scale, be admitted as a member of the Association. Referring to the rules of the society, the chairman read that anyone practising dentistry exclusively as a means of livelihood or in combination with the drug trade was qualified to become a member.

The questioner, in retort, asked when and where a man employed in the drug trade could have served his apprenticeship as dentist.

The chairman, after some discussion, said that in all cases great care was taken in enquiring as to the qualification of any candidate for membership.

Another gentleman asked: Could a registered man become a member of the Association?

Answer by Chairman: That question has already received

the consideration of the Council—that we have to receive very definite proof that such applicant was really a friend to the association before he could be admitted.

Another gentleman put forward the question: Could an assistant to a registered man become a member of the association?

Answer: Yes.

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

The following candidates passed the first Dental Examination at the October meeting of the Examiners:—

Robert Black, Wm. K. Carew, Robert A. Dickson, Sidney R. Excell, George Fisher, Robert S. Grant, Wm. M. Irving, J. Burns Watson.

Seven candidates were referred.

At the same period the following candidates passed the Final Examination, and were admitted Dental Licentiates:

David Dathl Davies, Llanrwist; George Fisher, Hessele, Hull; John Campbell McCrindle, Glasgow; Robert Wilcox, Bristol.

Three candidates were referred.

APPOINTMENTS.

Mr. M. Yeatman Woolf has been appointed Honorary Dental Surgeon to the Training Home, West Hampstead.

Mr. J. Graham Munro, L.D.S., appointed Dental Surgeon *vice* Mr. W. Forrester resigned, and Mr. Fred J. Turnbull, L.R.C.P. & S., L.D.S., appointed Assistant Dental Surgeon, *vice* Mr. J. Graham Munro promoted.

VACANCIES.

National Dental Hospital, Great Portland Street. There are vacancies for Demonstrator and Lecturer on Dental Surgery. Applications to be forwarded to the Dean.

National Dental Hospital. There is a vacancy for an Assistant Dental Surgeon. Applications to be forwarded to the Secretary.

Dental Hospital Reports.

WORK DONE at the Victoria Dental Hospital of Manchester,
during the month of Sept., 1895.

Number of Patients attended	876
Number of Extractions	672
Number of Extractions under Anæsthetics	161
Gold Stoppings	22
Other Stoppings	54
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	305
Crowns	5
Irregularities	10
Total	1229

J. BUTTERWORTH, *House Dental Surgeon.*

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
6. The Journal will be supplied direct from the office on PREPAYMENT of subscription as under:

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British Journal of Dental Science.

No. 668. LONDON, NOV. 15, 1895. VOL. XXXVII.

ORAL SURGERY.

By EDMUND W. ROUGHTON, B.S., M.D. (Lond.), F.R.C.S.
Eng.

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(Continued from page 973.)

DENTAL CYSTS.

Under this name authors have described two conditions which closely resemble each other clinically, and in naked-eye appearance, but which differ essentially in their pathology. One is a form of odontome, and the other is of inflammatory origin. As one clinical description will serve for both kinds of cysts, it will be convenient to describe them together.

Symptoms. They are met with more frequently in the maxilla than in the mandible, and generally in the neighbourhood of the incisor or canine teeth. They are usually of small size, and come away with the tooth when it is extracted, but sometimes they may attain considerable dimensions, and may cause more or less expansion and absorption of the outer wall of the maxilla, so that the bone crackles when pressed with the finger. Sometimes they may involve the antrum secondarily, by causing absorption of the intervening bone. They are always unilocular, and do not contain any tooth or rudiment of a tooth. The fluid which they

contain may be clear yellow or reddish serum, a thick glairy fluid of varying colour, or a semi-purulent fluid. The growth of the cyst is usually slow and painless ; one or more teeth in the neighbourhood are often carious.

Pathology. Microscopic examination shows that some of those cysts are lined by a layer of epithelium similar to that of the enamel organ, and that others are destitute of any such lining.

The first variety is supposed to be formed from the paradental epithelium. It is therefore closely allied in nature to the epithelial odontome already described, but differs from it in that the cyst is unilocular and is devoid of the solid epithelial columns found in the multilocular tumour. Some authorities think that the paradental epithelium may be started into activity by the irritation of a carious tooth in the immediate vicinity. To distinguish it from the other form of dental cyst this condition might well be termed "unilocular cyst or odontome."

The second variety is of inflammatory origin and is always found in connection with a diseased tooth. The inflammation starts in the apical space in the same way as an alveolar abscess, but the process is extremely chronic and leads not to the formation of pus, but to an accumulation of serous fluid enclosed within a fibrous sac. For this variety of dental cyst the old term "periosteal" may very well be retained.

Treatment. The treatment of dental cysts is the same as that of follicular odontomes (dentigerous cysts.)

RADICULAR ODONTOMES.

Radicular odontomes arise after the crown of the tooth has been completed and whilst the roots are still in the process of formation. The tumour consists of dentine and osteo-dentine in varying proportions ; when the former tissue preponderates it is called a radicular dentoma ; when the latter is in excess, radicular osteo-dentoma. Fig. 29 represents Salter's well

known specimen in section. The outer layer of the tumour is composed of cementum, within which is a layer of dentine incomplete below. The central part is formed of calcified



Fig. 28. Radicular Odontome (Salter).

tooth pulp, and contains a confused mass of bone and dentine.

Radicular odontomes are rare in man, but are common in

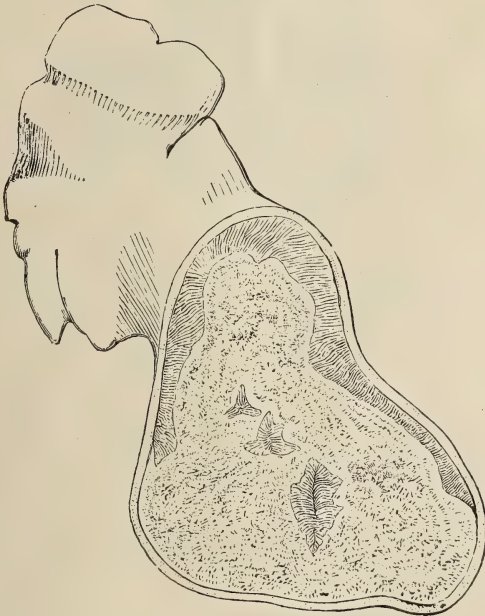


Fig. 29.—A section of the same tumour as Fig. 28 enlarged (Salter).

other mammals especially rodents. They are often multiple. They frequently lead to suppuration.

The symptoms of this and of other varieties of hard odontomes are so misleading that, according to Bland Sutton, up to the present time no case has been correctly diagnosed before the removal of the tumour; most often they have been mistaken for exostosis, for necrosis or for unerupted teeth. The treatment consists in removing the tumour, scraping out the cavity and allowing it to granulate up.

CEMENTOMES.

When the capsule of a tooth follicle becomes greatly thickened and ossified, the contained tooth comes to be embedded in, or attached to, a mass of cementum. This form of odontome is shown in Fig. 30. Cementomata occur most

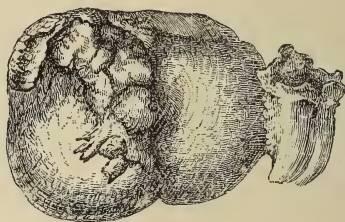


Fig. 30.—Cementome (*Forget*).

frequently in horses, and may attain a large size, one specimen weighing seventy ounces.

FIBROUS ODONTOMES.

A fibrous odontome consists of a tooth enclosed within a greatly thickened tooth sac. The latter is so thick that it prevents the tooth from erupting. Fibrous odontomes are commonest in ruminants, especially goats. They are often multiple. According to Bland Sutton the thickening of the tooth capsule is due to rickets. They have usually been mistaken for fibrous or myeloid tumours.

FOLLICULAR ODONTOMES (DENTIGEROUS CYSTS).

Follicular odontomes are more often met with in the mandible than in the maxilla. The cyst wall is composed of

a thickened and expanded dental sac, and usually contains calcareous or osseous matter. The fluid inside the cyst is usually clear and watery, but may be viscid, sanious or gelatinous; sometimes, though rarely, the cyst contains a thick putty-like material composed of degenerated epithelial cells. Sometimes no trace of a tooth is found inside the cyst, the process of expansion having taken place at so early a period

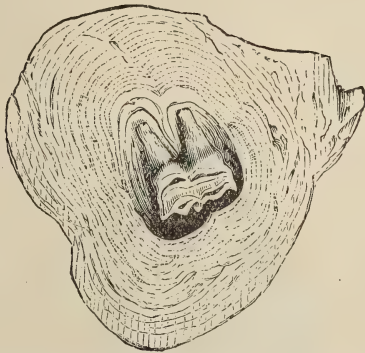


Fig. 31.—Fibrous odontome from a goat (*Bland Sutton*).

that the dental papilla has become absorbed before it has had time to form any dental structure. The great majority of follicular cysts contain some portion of a tooth. The tooth may be complete and may be free in the cyst, but it is usually implanted in the cyst wall, with its crown projecting into the cavity, the roots being truncated or imperfectly developed. Occasionally the tooth is inverted. Follicular cysts are almost invariably in connection with the permanent teeth, especially the molars. The specimen depicted in Fig. 32 contained the crown of the second molar tooth, and was removed from the mandible of a boy eleven years old. Occasionally the encysted tooth is a temporary or even a supernumerary one.

There is some difference of opinion as to the exact manner in which a dental follicle becomes distended to form a denti-

gerous cyst. All observers agree that the fluid collects between the tooth and the follicular wall. Broca attributes the presence of this fluid to morbid degeneration of the cells of the enamel organ. Malassez attributes it to hypertrophy of these same epithelial cells. According to Tomes a small quantity of fluid is normally formed between a tooth and its sac, and is discharged when the tooth is cut ; any cause impeding the eruption of the tooth leads to excessive accumulation of this fluid. According to Alberran this impediment to eruption is most often furnished by a blocked condition of the *iter dentis*.



Fig. 32.—Follicular Odontome or Dentigerous Cyst.

Symptoms. Follicular cysts are most frequently seen in the mandible of young people. They form slowly growing tumours which expand the plates of the bone. Whilst they are still small and are covered by a thick layer of osseous tissue they feel solid and may easily be mistaken for solid tumours ; but sooner or later the bony wall becomes so attenuated that it can be indented by the finger ; they are then easily recognized as cystic swellings. Usually the swelling is more or less hemispherical and projects from the surface of the jaw, but in some cases the whole body of the bone may be evenly expanded in all directions. An examination of the mouth will often show that there is a permanent tooth missing

but too much reliance must not be placed on this deficiency, The tooth may have been removed or it may be absent as the result of individual peculiarity ; on the other hand the number of teeth in the mouth may be correct and the cyst may contain a supernumerary tooth or one not usually cut until a later age, thus the cyst depicted in fig. 32 contained a twelve-year-old molar, and was removed from a boy eleven years old. In many cases a diagnosis is not possible until an exploratory incision has been made. Such incisions should not be made unless the surgeon is prepared to complete the necessary treatment at the same sitting, especially when the cyst is a large one, for the contents are very likely to become septic and give rise to a great deal of trouble. Follicular cysts very rarely suppurate unless they have been interfered with.

When these cysts occur in the maxilla they very often project into the antrum, and may be indistinguishable from other cystic swellings in this situation until they have been opened.

Treatment. The necessary incision can nearly always be made from within the mouth, but in large or awkwardly placed cysts it may be necessary to make the incision from without. The cyst must be freely opened by removing a portion of the cyst wall. The contained tooth and the lining membrane must be removed. The expanded walls may then be squeezed in so as to diminish the size of the cavity. The latter must be filled with an antiseptic dressing which must be renewed every day and the cavity syringed out with a weak antiseptic solution.

COMPOUND FOLLICULAR ODONTOMES.

According to Bland Sutton this odontome results from sporadic ossification of a thickened follicular wall, and contains a number of small teeth or denticles composed of cementum or dentine, or even of cementum, dentine and enamel. The

following case recorded by Tellander may be quoted as illustrating this variety of tumour. The patient was a woman aged twenty-seven years. "The right upper first molar, bicuspid, and canine of the permanent set had not erupted, but the spot where these teeth should have been was occupied by a hard, painless enlargement, which the patient had noticed since the age of twelve years. Subsequently this swelling was found to contain minute teeth. There were nine single teeth each one perfect in itself, having a conical root with a conical crown tipped with enamel, also six masses built up of adherent single teeth. The denticles presented the usual characters of supernumerary teeth." (Sutton).

COMPOSITE ODONTOMES.

These tumours consist of a disordered conglomeration of enamel, dentine and cementum, and arise from an abnormal growth of all the elements of a tooth germ, viz. enamel organ,

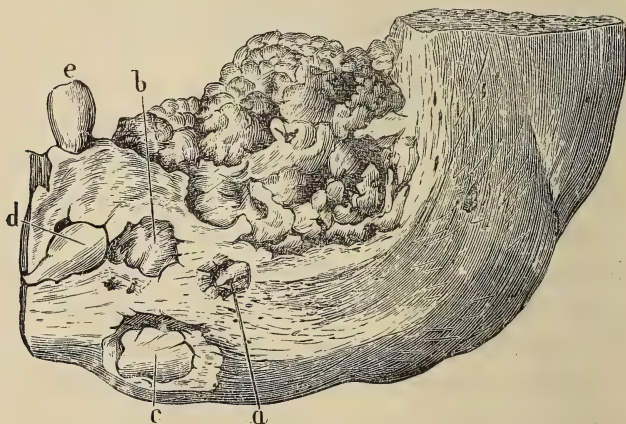


Fig. 33.—Composite Odontome (Forget's case).

a and *b*, portions of the tumour projecting through the bone. *c*. Crown of an inverted molar. *d*. Second bicuspid. *e*. First bicuspid.

papilla and dental sac; often two or more tooth germs are fused indiscriminately. They differ from the compound follicular odontomes in that the various parts of the teeth

composing the mass are indistinguishably mixed instead of forming separate denticles.

Forget's well-known specimen (Fig 33) is usually regarded as an odontome of this kind. It was removed from a man twenty years old in whose lower jaw it had been growing since he was five years old. It formed a round, smooth, hard tumour occupying nearly the whole of the left side of the mandible; all the teeth behind the first bicuspid were absent. When the portion of jaw shown in the figure was removed, it was seen to be converted into a cavity occupied by a hard oval substance the size of an egg, composed of an irregular mass of enamel, dentine and cementum. The affected tooth germs were supposed to be the last two molars.

(To be continued.)

DENTAL MECHANICS.

By HARRY ROSE, L.D.S. Eng.

Lecturer in Dental Mechanics, National Dental Hospital.

PLATE WORK.

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(Continued from page 967.)

Method of refining gold by heat.

If the gold to be refined is in the shape of filings, a magnet may be passed through them several times to collect and remove the iron that is usually found in them.

The filings may now be treated by boiling them out in Nitric Acid; this will still further remove the base metals. After

the acid is poured off, and the filings washed and dried, they may be placed in a skittle pot (see Fig 1) after being mixed with about double the weight of Pot. Carb., and a few pieces of Pot. Nitrate.

The pot is now warmed up and inserted in the furnace, and subjected to a strong heat for about an hour.

If in the course of melting, the contents of the skittle pot show a disposition to boil over, a little Sodium Chloride (common salt) thrown in from time to time, will cause them to subside.

After having subjected the pot to heat for the time named, it should be removed from the fire and placed on the hearth to cool somewhat, after which it may be more rapidly cooled by pouring cold water into it.

The pot may now be broken up, and the button of gold which will be found at the bottom removed and cleaned from flux.

If the gold has not had sufficient heat to fuse and collect it properly, instead of being found in one clean round mass it will be found scattered about the pot in particles ; in this latter case, the contents of the pot should be collected and remelted.

When the button of gold has been thus freed from adherent flux, it should be remelted in a black lead pot (Fig 2) with a little borax, and covered over whilst melting. Small pieces of Pot. Nitrate should be thrown in from time to time, taking care to recover the pot. When the gold has been subjected to considerable heat for half an hour it may be poured into a suitable ingot mould which has been previously warmed and oiled. The ingot of gold should now be hammered at the ends, and then rolled. The object of hammering the ends is to spread the fibres of the metal and prevent the edges from cracking. Should it crack or exhibit any defects, it must be remelted in a clean pot with borax, using more Pot. Nitrate

thrown in as before. This process will in the majority of cases toughen and refine the gold and make it workable.

To ascertain its quality a small piece say 20 grs. may be taken and dissolved in Aqua Regia. The silver will be left as chloride at the bottom of the flask ; this may be dried and weighed. The gold solution should then be treated with Fe SO_4 which will throw down the gold, and to the solution left after separation from the gold add ammonia chloride, which will throw down Platinum, if present. By this means the quality of the gold can be ascertained, at any rate sufficiently so for the practical purposes of Dentistry.

If the gold to be melted is in the form of scraps it will only require borax as a flux to melt it, and Pot. Nitrate thrown in whilst melting, to make it tough, each time re-covering the pot. If after subjecting the gold to a strong heat for half an hour and looking into the pot, the surface of the melted gold appears clean like a mirror, and free from impurities which would otherwise cloud and scintillate over its surface, the pot may be taken out of the furnace and the gold poured into a mould previously warmed and oiled. Should it not prove tough it must be remelted, and submitted to the same process as before, giving it a more prolonged heat.

Sometimes it may be necessary to treat the melted gold with corrosive sublimate (bi-chloride of mercury) or sal ammoniac (ammonia chloride). The chlorine is the active agent in this latter case for removing the impurities in gold.

Preparation of the furnace for melting. Before the fire is lighted, an old crucible or half a fire brick should be placed in the centre of, and on the bars at the bottom of the furnace, in order to form a foundation for the pot containing the gold or other metals, to rest upon. The fire is then lighted with wood and coal in the ordinary way, and when a clear fire is produced up to, or slightly above, the edge of the fire brick, the pot containing the metal should be placed in position,

so as to rest on the fire-brick, and then the furnace filled up either with gas coke, or a harder and heavier coke made from anthracite coal, called foundry coke, which gives a greater and more lasting heat than the former, but which requires a good draught for its thorough combustion. A very good method is to mix the two kinds of coke; the object of having this sort of fuel is that the furnace does not require replenishing so often.

When melting gold in a skittle, or ordinary fire-clay pot, it is as well to insert it into another one, (Fig. 3). This

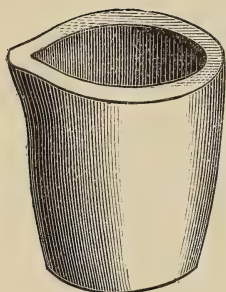


Fig. 2.

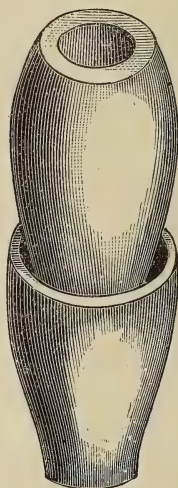


Fig. 3.

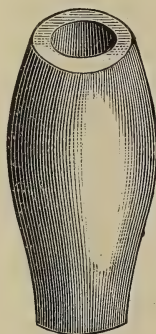


Fig. 1.

protects the pot containing the metal, and is also a precaution in case it should crack, and its contents run out. In such a case the gold would run into the bottom pot instead of into the fire. With a plumbago or black-lead pot, the bottom pot may be omitted, as these pots are not likely to crack if treated with ordinary care in heating up, before inserting into the furnace. These pots therefore, are the safest to use.

If it is desired to dispense with a bottom pot, the ordinary skittle pots may have a luting composed of "fire-clay, pounded baked clay and hay" plastered over the lower two thirds. The spot when luted are placed in a warm place, and allowed to dry for some time before being used; this investment protects the pot from sudden changes of temperatures, thereby avoiding cracking.

When melting it is essential to have all ashes or rubbish removed from under the furnace, for if by accident, or other cause, the pot breaks or gets upset, there is that amount less of rubbish to extract it from.

Should such an accident happen, the contents of the furnace must be carefully cleared out, and, together with the broken pot, pounded up in an iron mortar, until all is reduced to a fine powder. A portion of this should now be placed in a tin bowl, and have water added to it. After stirring up, the water is more gently agitated, and the finer particles of dirt washed away, more water is added and the process repeated until the dirt is washed away. All the material is served in the same manner, and after this washing the remainder is pounded and again washed, when ultimately there will remain at the bottom of the bowl the lost gold contaminated with the heavier portions of rubbish that will not wash off.

If this operation is done carefully and the rubbish reduced to a fine powder, nearly all the gold will be recovered; it should be mixed with Pot. Carb., and remelted in a skittle pot and either refined again or sold.

DENTAL ALLOY.

This is an alloy of platinum and silver, and is prepared in the following manner,—

Take one ounce of platinum in the form of foil, and cut into thin strips; add to this two ounces of either fine or coin silver. Place the silver at the bottom of the crucible (black

lead pot,) and the platinum foil on top, so that when the silver melts the platinum may pass into it. Platinum being the heavier of the two metals, when melted it should be stirred with the stem of a tobacco pipe ; it requires a good heat to melt it, and must then be poured into the mould very quickly. The principal thing to observe in melting dental alloy, is to see that all the platinum is thoroughly incorporated with the silver ; to ensure this an excess of platinum may be used, as silver will only take up a certain quantity. When making new dental alloy only a small quantity of borax need be used as a flux.

Dental alloy filings, or old scraps, may be melted and refined like gold, using saltpetre in the same way to make it tough. If platinum in the form of scrap, pins of teeth, &c., is used in the place of foil, greater care must be observed in melting it, in fact it requires to be remelted once or twice in order to get a thorough incorporation with the silver.

(To be continued).

SIR RICHARD QUAIN ON THE GENERAL MEDICAL COUNCIL.—“ We are compared sometimes with the lawyers, but if you look at the solicitors they have no power. However infamous a man's conduct may be, they must bring him before a court of law. We need not do that. The highest court has pronounced that if we declare a man's conduct “infamous,” there is no appeal. It is so, and therefore, it makes us extremely careful in coming to a decision on that point. But there are degrees of disgrace less than infamy which ought to be corrected. This should be done by the medical authorities in their by-law.”

British Journal of Dental Science.

LONDON, NOVEMBER 15, 1895.

SIR CHARLES BELL ON TIC DOLOUREUX.

Our correspondent "Bibliophile" sends us a copy of "Practical Essays," by SIR CHARLES BELL, published in 1841. The price originally was five shillings, but various pencillings by booksellers show that this particular volume changed hands at one and sixpence, threepence, and finally to our correspondent for twopence. We can congratulate him upon his purchase even if, as he seems to hint, it entailed losing his train! The author was the well-known Professor of Surgery in the University of Edinburgh, and was of opinion that "a member of the University should watch the current opinions on the subject he teaches, and endeavour to check the wrong bias which fashion and accident are continually giving to Medical Studies, to the neglect of sound doctrine, and of approved authorities." Accordingly we find him writing upon the causes of sudden death during surgical operations; on the questionable practice of bleeding in all apoplectic affections; and finally, in the last of the essays, "On the Action of Purgatives on the different portions of the Intestinal Canal, with a view of removing Nervous Affections and Tic Doloureux." He states in his Preface that the professional friends "who shall peruse these pages" will acknowledge that they treat of subjects of much difficulty, but embracing questions of practical importance, and he declares *æquo animo* that "they will not regret that their attention has been solicited to them." Although coming half a century later, we need little "solicitation" to read his classification of the affections of the nerves of the face, his interesting case of Charles Delafield, or his speculations as to referred pain.

To our mind, there is always something attractive in the study of the attempts in the past to approach the truth, and it is only the very superior person who can refrain from a feeling of sympathy and gratitude when reading of the endeavours of the master intellects to solve problems which have, in our day, become clearer in the light of the knowledge such workers have helped to give us. Here we have, for instance, SIR CHARLES BELL trying to explain how it is that in *tic douloureux* the nerve is not organically affected it is influenced by remote irritation, but in the absence of any knowledge of direct nervous connection he finds it a difficult subject. Alluding to the hypothesis that impressions were conveyed to the sensorium, and thence to parts remote from the original disease, he thinks it unsatisfactory to say that the irritation is conveyed to the fibres of the brain; "for why does not the pain return, by corresponding and parallel fibriles, to the same part from whence the irritation came?" Yet he has a suggestion to make. When two fibrils are bound together, the one being disturbed, does it communicate an influence to the other and hence a sensation is attributed to the extremity of that nerve? "Or is it, that the painful impression being communicated to the sensorium by a nerve of an internal part (itself not sensible), the sensation is attributed to the external and more sensible cutaneous nerve which accompanies it?" We see, then, that Sir Charles had almost arrived at the law, quoted by Dr. HENRY HEAD in his recent papers, that where a painful stimulus is applied to a part of low sensibility in close central connection with a part of much greater sensibility, the pain produced is felt in the part of lower sensibility to which the stimulus was actually applied.

The remainder of the essay deals with the remote effects of derangement of the intestinal canal, and the result of treating *tic* by the action of croton oil upon the small bowel. It seems this was not the only disease attributed by Sir Charles to disturbance of the intestines, for in a communication in the present number of the *Glasgow Medical*

Journal we read that in recording cases of muscular atrophy he supposed the affection was connected in some way with the sympathetic system of nerves, and, through that system, with the bowels. Dr. MUNRO says that this allusion to the sympathetic foreshadows the promulgation of a theory which is commonly supposed to be of much more recent origin. In regard to the action of the croton oil, presuming the connection between the intestine and the *tic* to be reasonable, we can find another allusion in Dr. HEAD's papers to support Sir Charles' position. Dr. HEAD thinks his own facts show that there is an intimate connection between the central connections for the sensory nerves of the viscera and the nerves which supply the sensation of pain, heat and cold, and that this will explain the occasional improvement in pains of a purely nervous origin by some visceral irritation, e.g., the removal of "lightning" pains over the sacral areas in a tabetic patient by the administration of a purge such as castor oil. In response to our correspondent's letter, we publish some of the Essay amongst Abstracts, and for those readers who may feel inclined to recommend croton oil in tic, we may mention that SIR CHARLES BELL never found it necessary to give more than one-twelfth of a drop.

A CURIOUS ACCIDENT.—A "broken nose" is not an uncommon occurrence, but that the whole of the upper jaw should be separated from skull is worthy of record. Mr. Hopkins reports a case admitted into the Swansea Hospital. A man, aged forty-nine was struck by a wooden beam on the back of the head, he was knocked forward against a coal-truck, so that the edge caught him at the root of the nose. The nasal and zygomatic processes were fractured, the superior maxillary bones were detached, and there was separation in the middle line of more than an inch. The frontal sinus and anterior ethmoidal cells were opened up, but the eyes were quite uninjured. The parts were kept in very good position by using a Smith's gag, which was worn continuously for a fortnight.

FATAL CASE OF COCAINE POISONING.—Dr. O. H. Garland records, in *The Lancet*, the details of the death of a young woman who swallowed from twelve to fourteen grains of the hydrochlorate of cocaine. It was taken, for the relief of toothache, in the form of more than two drachms of a ten per cent. solution. Almost immediately afterwards there was vertigo followed by nine seizures of epileptiform convulsions, and death occurred within forty minutes. At the *post mortem* the brain was found to be anæmic, but the lungs were much congested throughout, and a considerable amount of frothy mucus, some blood-stained, was present in the bronchi. Dr. Garland alludes to other reported cases and thinks that his confirms Mannheim's estimate that about fifteen grains is the fatal dose of cocaine. "In the present state of our knowledge it is, however, practically impossible to state the smallest lethal dose, seeing that a dose of two-thirds of a grain has caused death, and so minute a dose as a hundredth of a grain has given rise to symptoms threatening life."

CHARITABLE DENTISTS.—A somewhat curious application has been made to one of the London magistrates by a poor woman who sought relief from the poor box in order that she might get some artificial teeth. It was from the esthetic aspect that her request was made, as her edentulous appearance prevented the woman obtaining a situation. Nothing appears to have been said about the function of mastication, but it is improbable that even an argument upon that point would have enabled the magistrate to see his way clear to accede. The sequel is interesting, inasmuch as a few days later the case was again mentioned by the magistrate, who had received letters from four dentists offering to supply the poor woman with teeth. Unfortunately the applicant had not left her name and address, and even the Court missionary was unable to supply the desired information. Perhaps the further

report in the Press of the proceedings may result in the contracting parties being put into communication, and then the magistrate may be called upon to decide upon which practitioner shall be favoured, or whether the patient shall be indulged with three extra dentures.

SPASMUS NUTANS.—In his remarks upon a case of “head-nodding,” Dr. Bannatyne considers that it is a disease *per se*, and not to be regarded as one of the many forms of epilepsy. He alludes to the suggestion that it arises from some reflex irritation, such as dentition, acting on an unstable nervous system. Most of the cases reported commenced during the first year of life, and the symptoms are generally only transitory. The probability is that there is an initial defect in the nutrition of the cortical cells, which being determined by some reflex irritation, passes first into a temporary state of increased activity and, if the irritation be severe enough, or be sufficiently long continued, of actual change.

THE GENERAL MEDICAL COUNCIL.—In consequence of the structural alterations in progress at the building in Oxford Street, it was thought that the ordinary November session of the Council would be postponed until next year. It has, however, been determined to summon a meeting for the 26th inst., room having been found at the Royal College of Physicians. There are some penal cases left over from last May, and the reports of the Visitors and Inspectors of Examinations will probably be presented.

THE DENTAL HOSPITAL OF LONDON.—The Annual Dinner of the Staff and Past and Present Students, will be held on Saturday, November 30th, at the Café Royal, under the Presidency of Mr. Frederick Canton. Gentlemen either now or formerly connected with the Hospital or Medical School, who may, through inadvertence, not have received special notice, and who desire to be present, are requested to communicate with the Dean, at the Dental Hospital, 40, Leicester Square.

Reviews.

La Pratique Des Maladies de la Bouche et des Dents dans les Hôpitaux de Paris. Par Le Professeur Paul Lefert. Paris, 1896.

This little book gives an account of the practice of the medical men in the Paris hospitals who are especially engaged with the diseases of the mouth and teeth. The different conditions are arranged alphabetically from Alveolar Abscess to Uranostaphylorrhaphy, and as sub-headings come the names of the various practitioners with their modes of treatment. There is also a table of these gentlemen's names to facilitate reference.

Guide to Medical and Dental Professions. By Percival Turner. London: Ballière, Tindall and Cox.

This is a handbook dealing with the Curriculum, Examinations, Regulations, and Ethics of medical and dental practice. Much of the matter may of course be found elsewhere, but the information as to the sale and purchase of practices, the employment of assistants, book-keeping, and other important subjects, is valuable as representing the experience of a well-known professional agent. There is also a chapter on lady doctors by Miss F. M. Strutt-Cavell. The price of the book is three shillings and sixpence.

A DENTIST FOR THEIR EMPLOYEES.—There is a large manufacturing establishment in Chicago which employs a dentist to examine the teeth of all applicants for work. If a tooth has a cavity it must be filled, or, if it is too far gone it must be pulled. This dental work is, in most cases, done at the expense of the factory, and has proved to be wise economy. Little time is lost on account of toothaches. Teeth of employees are examined at regular intervals, whether they are giving their owners any trouble or not.

Abstracts of British & Foreign Journals.

WHICH METHOD OF ROOT-CANAL FILLING WILL COMPLETELY OBLITERATE SPACE?

By SAFFORD G. PERRY, D.D.S., New York.

The methods I employ for the most part require openings to be made through the teeth directly over the roots in a line with their long axis, so that their canals can be entered with nearly straight instruments. The methods of cleaning and filling the canals, which will be described later, will show this to be an almost indispensable condition. If the cavities of decay do not allow this fairly direct approach, then tap-holes are to be drilled through the tooth, so that the roots can be entered in a nearly straight line. Leaving all cavities out of the question, and first considering sound teeth that are dead and have to be opened, we have then only to regard the fissures in the crowns, and to remember the anatomy of the roots, in order to know exactly where to drill. No mention need be made of the superior and inferior incisors, further than to say that, as a matter of course, they are to be drilled on their lingual sides, and at such angles as will give access to their canals in nearly a straight line. The first inferior bicuspid must be drilled through the small anterior crown fissure; the second bicuspid through the anterior division of its single irregular fissure. The first lower molar, not through the deep fissure near the middle of the crown, but just anteriorly to it, so that the tap-hole will come nearly over the anterior root. The tap-hole should then be reamed posteriorly to give access to the posterior root. The backward slant of this root is such that nothing more is needed to give direct access to its canal. Then, substituting a right-angle hand-piece, the same tap-hole should be reamed towards the buccal and the lingual sides of the tooth, and this will open up the two canals in the anterior root, so that nearly straight instruments can be passed to their extremities. The inferior second molar should be entered just anteriorly of the deep middle fissure, so that the anterior root can be entered in nearly a straight line. A little reaming posteriorly will give access to the posterior root, as in the case of the first molar. The inferior wisdom tooth should be entered, also, just a trifle in

front of the centre of the crown. The superior first bicuspid should be entered through the anterior depression of the fissure. This will give direct access to the two roots, if they exist. The second superior bicuspid, of course, through the fissure in the centre of the crown. The superior first molar should be entered through the anterior deep fissure, and the tap-hole reamed towards the palatine and buccal roots. The superior second molar should be entered through the anterior fissure in the same way. The superior wisdom tooth should be entered from the anterior edge of its irregular fissure. The sizes of these tap-holes must vary with the different teeth. They must be as small as possible, in order not to weaken the teeth ; but, on the other hand, they must be large enough to allow the entrance of light, and to give a chance for accurate work. One naturally shrinks from drilling a hole in a sound tooth, but it is a necessary means to an end, and the patient had better have a weakened tooth with healthful roots than diseased roots and a sound, strong tooth.

Thus far I have assumed the absence of cavities. If they occur in the centre of the crowns, or on the anterior approximal surfaces of the molars and bicuspid of either jaw, tap-holes may not be necessary : but if they occur on the posterior approximal surfaces of these teeth, and are not very large, tap-holes are indispensable. If they are not considered so for the use of the instruments generally employed for cleaning and filling the roots, they certainly are for the use of the instruments I shall describe. A large cavity in the posterior surface of a lower molar may give direct access to the posterior root ; in that event, the tap-hole can be drilled more directly over the anterior roots. In such cases I have many times drilled two small holes over the front root, one over each canal, throwing the light by reflection through the cavity of decay. In the same manner a large cavity on the posterior surface of the superior molar may give direct access to the palatine root, and two tap-holes, one over each of the buccal roots, will give direct access to their canals. Often the tooth substance between these two tap-holes can be cut away with a fissure bur, leaving a slot through which work is facilitated, and without much weakening of the tooth. This slot will be nearly half-way between the bottom of the deep fissure and the tips of the buccal cusps. In this case, also, light by reflection can be afforded through the cavity of decay, and the tap-holes can be very small and the slot very

narrow. If these large cavities on the posterior surfaces of molars do not quite give direct access to the posterior or palatine roots, a fissure-bur readily cuts a groove in the grinding surface edge of the cavity, and a tapered root-canal reamer, revolved on the posterior side of the opening into the canals, opens up the roots so that a straight broach wrapped with cotton can be rotated in it, and this rotation may be essential to its thorough cleansing. The reamers are never used, except for opening the orifices of root-canals. They have a very gradual taper, so that no shoulder or irregularity of surface is left, as often occurs with the reamers in general use. Cutting, as they do, on their sides, they are very dangerous instruments to use deep in the roots, and their use is therefore restricted to opening the orifices of the canals. And here let me say that I never use any of the means employed for enlarging the canals, except at their orifices, as described. The roots of teeth are often very crooked, and some are very flat and thin, and an immense number of valuable teeth have been lost by heroic drilling through their sides. An untouched canal is always smooth, and, though curved, its extremities can almost invariably be reached with the proper instruments. I will not say that I never use a fine barbed broach for the removal of freshly devitalized pulps, but I will say that I seldom use them, even for that purpose, and I do not use them in any canal in which a pulp has been for some time dead. In their place I use the well-known Swiss broaches, made for watchmakers, and which can be found at any of the places where jewellers get their supplies. They are four-sided, and highly polished and spring-tempered. I place a dozen or two of them in a glass tube, and draw the temper to a deep blue, over an alcohol lamp or a Bunsen burner. The glass protects them from currents of cold air, allows them to cool slowly, and enables one to see the colour of the steel. On these tempered instruments shreds of cotton or raw silk can be lightly or loosely rolled, so that it can be withdrawn from the root of a tooth, or left in it, as desired. If tightly rolled, it can be entangled in a devitalized pulp in such a way that the whole pulp can be removed with considerable precision. The silk or cotton, though very tightly rolled, is yet easily removed from the instrument by laying it between the folds of a napkin and pulling it off with the thumb and finger. If it has been used in a root long dead, the fingers can be protected from the

bad odour of the cotton or silk by the use of a piece of rubber dam placed outside of the napkin.

There many advantages in the use of this instrument in all the root canal operations. In the first place, the fact that the broach is square makes it possible to roll the silk or cotton upon it with any degree of looseness or firmness in an instant of time. This, of course, cannot be done with a round, smooth broach. Having no barbs, the cotton or silk is equally quickly removed between the thumb and finger. Also, having no barbs, there are no weak places along its whole length, and it does not readily break. Every barbed instrument is weakened at the base of every barb; even a cross scratch on any round instrument determines the place where it will break, if it break at all. If the barbed instruments do not break off entirely, the barbs almost invariably do, and in the canals, from which they cannot be removed. Besides, the barbs increase the diameter of the instrument, and it is generally accepted that the fine canals of the anterior root of the first lower molar and the buccal roots of the superior molars cannot be entered to their extremities. Swiss broaches can be procured that are almost hair-like in size, and their diameter is but slightly increased by a few fibres of silk or cotton, and they can be carried almost invariably to the end of every root-canal. Charged with carbolic acid and used with patience, the living fibrils of pulp in a minute canal can be removed little by little. It takes time, but finally the end of the root will be reached, and after the use of a great many rolls of silk it will finally come out of the canal, white and dry and clean. Or, if the root has been long dead, the same persistent effort will bring it out clean and comparatively odourless. By rotation of the instrument the contents of the canal become entangled in the silk and are removed. This rotation of the instrument is very essential, and now it can be seen why it is so necessary to open the teeth in such a way that a straight instrument can be used. These slender instruments can be employed in a wonderful way if they are kept straight, but they become unmanageable if they are bent.

For places where a stiff instrument is needed, I have points made from untempered piano wire, but filed square so that the cotton can be rolled on them in the same ready way. They are tapered like a trout rod. They are stiff near the shank, and are therefore very manageable, and can be bent to enter a canal where direct access to it cannot be easily had.

The method by which these points are fastened to the handles originated with Dr. Darby. They are soldered to a little shank, and that is threaded and screwed into the socket handle. In this way they are held firmly. This is a little thing, but it has been of great value to me.

There may be nothing new on the subject of filling root canals of good size. The posterior roots of lower molars, the palatine roots of superior molars, and the roots of the bicuspid and of the incisors are probably filled by most operators either with chloro-percha, followed with the gutta percha points, or with oxychloride, followed by the same points, in a manner that may be proof against the most searching criticism. I think it will be generally admitted that the anterior roots of lower molars, and the buccal roots of superior molars, and very minute canals in general, have not only not been accurately filled, but have not always even had their pulps completely destroyed and removed, and in old, dead teeth they have not always been cleaned. I will not go so far as to say that with the delicate Swiss broaches, in the way described it is possible to get to the end of all these inaccessible canals, but I will state that it is a practical thing to do so in almost every case. It is not only possible to get the canals clean, but it is also possible to fill them with a considerable degree of accuracy. If the hair-like broach which is used for cleaning one of these fine canals were wrapped with silk or cotton and that charged with oxychloride or with chloro-percha, and then carried down to the closed end of the root (and these fine canals are always practically closed), and it could be left there, no one could deny that the canal must be filled with all the accuracy that could be expected in any root filling. But, of course, the steel wire would not be permissible. When it is removed a space is left. Some of the chloro-percha or oxychloride may remain. We may repeat this process, and still there will be the same result.

Let us not deceive ourselves by believing that into such a minute hole, closed at one end and full of air, we can pump either of the materials named in such a way as to obliterate all space. With a minute opening at the end of the root for the escape of the air, it might be done, but in the roots of teeth in the mouth it is an impossibility. If we wrap the fibres of silk or cotton loosely so that they slip off the instrument and remain, still there is the space left by the instrument when it is removed. The only way is to leave the instrument itself. This result I accomplish by substituting gold or platinum

wire, in the following manner : The end of a piece of gold wire, smaller than the diameter of the canal to be filled, is bent over on itself with the pliers, and crimped to a uniform size in a fine groove in the beaks of the pliers. The length of the portion bent over is not more than the diameter of an ordinary pin. This is done in order to get a better hold of the wire if it ever needs to be removed from the root. In attempting to pull it out, if it does not come, but straightens out, there is then wire enough to get hold of with suitably made pliers. This doubled end of the wire is then fastened in a delicate pin-vise made for the purpose. The depth of the canal having been measured by slipping on the Swiss broach one of the rubber disks cut from the rubber dam by the Ainsworth punch, the wire is cut to the right length and then, being firmly held by the pin-vise, is filed square to a tapering point by a very fine file. On this wire a half-dozen or a dozen fibres of silk or cotton are rolled exactly as is done on the Swiss broach. This is then transferred from the pin-vise to a plugger-point, into the end of which a hole is drilled, large enough to receive the doubled end of the gold wire. The fit is close enough to hold, and yet so loose that when the gold wire has been put to its place in the root, the plugger slips off and leaves it in place. This gold wire, while held in the plugger point, is dipped in chloro-percha or oxychloride of zinc and put at once to its place in the root, the canal having just been swabbed with a cotton-wrappad Swiss broach wet with a very thin solution of the chloro-percha or the oxychloride, as the case may be. When this gold wire is carried to its place, it is certain that the root is filled to its extremity as perfectly as it may ever be. The plugger is of soft steel, so that, in a moment it can be bent at any angle. In this manner it is possible to fill these canals through a comparatively small tap-hole. This operation requires nice manipulation (there is none in dentistry that requires nicer) ; but it can be done, and exactly as described here.

The objective point in all root filling is the apical end of the canal. I believe this can be reached with unerring certainty by no other means than by a wire in some form. When this is well filled, the rest of the canal can be poorly filled, and yet the tooth will do well. In general practice I think this end is poorly filled, and the accessible part of the canal is well filled. I am ready to make the assertion that the roots of any tooth freshly devitalized and filled in this way will never give trouble. It is an almost impossibility if it is

accomplished with thorough sterilization. Of course, I would not make any such claim for any tooth that had been dead for some time before the treatment was applied. Dead roots in which and about which septic influences have been at work, must always remain somewhat uncertain.

For large canals, and those open at the apical ends, I used pointed gold wire dipped in chloro-percha, or barbed and warmed, and wrapped with red gutta-percha. A few years ago Dr. Howe called attention to the fact that gutta-percha is a neutral substance, and, besides having no antiseptic action, is capable of absorption, as shown by the disagreeable odour arising from it when removed from a root-canal and warmed over the flame of a lamp, as well as from its tendency to expand. In fact, this warming is not necessary to demonstrate the fact stated. I recognised the truth of this, and from that time I preceded the gutta-percha points in closed roots with chloride of zinc, plunging the cold, stiff points through this creamy substance, and then filling the root chamber with it. When these points are surrounded by an envelope of oxychloride of zinc, I think the root remains sterilized, and that this combination makes almost an ideal root-filling. It has the advantage of comparatively easy removal, and that I think, is an important consideration. If the canals are only of medium size, and there is danger that the points will be doubled up and not carried through the oxy-chloride to the apex, then I use gold wire in the manner already described, but wire, of course, of larger size. If the canals are open at the apex, I use gold wire wrapped with a few shreds of silk and dipped in chloro-percha, and pushed to the apex by exact measurement. If the canals and the opening at the apex are very large, then I use gold wire barbed and wrapped with red gutta percha, putting it in and taking it out several times to get a sort of impression, of the canal, and thus being able to judge a little better of the amount to use, and putting it in finally by exact measurement.

All these gold wires have provision made for their removal, the large one having a notch filed near the end in which an instrument can be engaged, and the little ones being bent double near the end. Where chloro-percha is used, they are all easily removed.

A METHOD OF ANCHORING LARGE CONTOUR FILLINGS IN INCISORS.

By C. N. JOHNSON, L.D.S., D.D.S., Chicago, Ill.

The essayist has no claim of originality to make for the method about to be described. Neither is he able to state to whom credit for originality should be given, for truth to tell, the practice has come to him in a gradual development of ideas gathered here and there, and in the practical application of those ideas to the purpose in hand. Observation has seemed to show a serious lack on the part of many operators to recognize and apply the best principles in the anchorage of contour fillings in incisors. By contour fillings we mean cases where the approximate surface is so involved that the occlusal corner is gone, requiring a reproduction in filling material. Given a case where the pulp is dead and the anchorage is usually easily obtained, but where the corner is gone without much penetration of the decay toward the pulp the result is a shallow cavity which seems to tax the average operator in his attempt to gain sufficient anchorage.

From observation it would seem that the majority of operators prepare the cavity in the following manner: After the usual conformation is given the cervical portion of the cavity, anchorage for the occlusal half of the filling is obtained by drilling obliquely into the cavity toward the occlusal surface between the two plates of enamel as they come together. Anchorage of this form frequently develops a weakness which results in a loosening of the filling as follows: The gold which is built into the occlusal undercut becomes slightly battered or compressed as the result of force exerted on the end of the filling, and the whole filling is thus allowed to tip away from the cavity, leaving a seam or space between the filling and tooth. In some cases a filling will remain partially dislodged in this manner for a considerable time without perceptible loosening, while in others the filling is forced bodily out of the cavity shortly after its insertion. It will readily be seen that any compression of the gold in the act of biting upon it will lift it away from its close adaptation to the occlusal undercut and result in a leakage of the filling—if not in a total dislodgment. So many cases of failure from this cause have been noted, and so many inquiries as to a surer method of anchoring these

fillings firmly in place have recently been made of the essayist that he has been induced to prepare a short paper embodying his views on the subject.

Possibly a clearer idea of the method to be described may be gained by taking a typical cavity and outlining its preparation than by speaking in a general way of the process. Let us suppose we have a large mesial cavity on a left upper central incisor. There is little penetration of the decay toward the pulp, but the entire mesio-occlusal angle of the tooth is gone. This form of cavity apparently presents greater difficulties to the average operator than where the decay has penetrated deeper. In the present method of preparation the cervical half of the cavity is shaped in the usual way, being liberally extended cervico-labially and cervico-lingually. To obtain anchorage at the occlusal portion of the filling, instead of drilling into the axial wall in the ordinary manner a groove is cut along the occlusal surface leading from the cavity distally to near the disto-occlusal angle. This groove must be made sufficiently wide and deep to admit of a large enough mass of gold being packed into it to ensure strength, and in order to accomplish this in teeth with thin occlusal surfaces it is often necessary to cut away the lingual plate of enamel somewhat freely. This may be done with safety provided the enamel margins are properly bevelled and gold built over them in the insertion of the filling. The distal end of the groove may be deepened somewhat to assist in retention. The philosophy of this form of anchorage consists in two things: First, it will prevent absolutely the tipping of the filling previously alluded to; and second, it increases materially the seating capacity of the filling. Since the appearance of Dr. Black's articles on the compressibility of filling materials and kindred studies, the seating area of our cavities becomes a matter of much importance, and it seems quite conclusively proved that, other things being equal, the larger the area upon which the filling rests to sustain it in the force of mastication the greater security it has against dislodgment. With the form of anchorage just outlined it becomes impossible for a filling to get out of a cavity short of a breakage, and if the mass of gold is made thick enough it will not break. It is readily seen that the greater the force brought to bear upon the filling in the closure of the teeth, the firmer it is driven into the cavity, and if there should be any compressibility of the filling material the tendency would be toward a closer adaptation to the cavity walls instead

of a lifting away, as in the ordinary method of anchorage.

As first glance there might appear to be several objections to this method. Some operators may feel a hesitancy about drilling into sound tissue in this way for anchorage, but it must be remembered that in the preparation of any cavity sound tissue is often sacrificed for this purpose. In this instance I am convinced that it is sacrificed to good account, and I feel sure that when the operation has once been done in this manner the operator will to a large degree find his hesitancy gone. There is a feeling of security when the gold has been built well over and anchored into the occlusal surface that does not obtain in any other kind of cavity formation for this class of fillings. Another objection might seem to rise in the apparently unprotected labial plate of enamel. The labial plate is always left standing for appearance even when the lingual plate must be cut away for strength, and if not properly protected might prove an element of weakness. But by carefully bevelling the enamel margin and building gold over the bevel, it is so perfectly protected that in all my experience with this method I cannot recall a single instance where this wall has failed. The acute corner at the mesio-occlusal angle should be rounded slightly, and the same corner on the lingual plate should be cut freely away so that the outline of the filling is a gentle curve from the proximate to the occlusal surface.

This form of filling provides an adequate protection for the end of the tooth, and does away with what is ordinarily a vulnerable point in most fillings of this class when constructed in the usual way, viz., the junction between gold and enamel at the occlusal surface. The slightest chipping away of the enamel at this point is often disastrous, and results in final destruction of the filling. Again, there is opportunity for deeper and firmer anchorage without danger of approaching the pulp than where an undercut is drilled into the axial wall. The cavity is rendered freer of access for the insertion of the filling, and while more gold is used, it is more readily inserted and is hidden from anterior view by the labial plate of enamel. A filling of this form therefore looks no more conspicuous in front than where the occlusal surface is left intact.

There are, of course, many cases of contour filling in incisors where this method is not applicable, such for instance as a pulpless tooth where the decay is deep, or where the

dentine is badly involved and the lingual wall gone for some distance toward the neck. These are the cases, however, where anchorage in other ways is easily obtained, and every operator must discriminate carefully and decide for himself which method is indicated in each case that presents. I have merely endeavoured to point out a method which is applicable to a certain class of cases, and I confidently believe that if it is judiciously carried out it will prove a reliable means of anchoring fillings in a form of cavity which heretofore seems to have given the profession much trouble.

The Dental Review.

THERAPEUTICS OF GREEN-STAIN.

By S. B. PALMER, M.D.S., Syracuse, N.Y.

The above subject is divided as follows:—

A. Agents facilitating the removal of the stain.

B. Agents acting preventively.

C. The proportion of recurrences of the stain, and of decalcification around fillings inserted, and whether one filling-material acts more beneficially than others.

A. All who have removed this pigment know that it is far more difficult than it would be to dislodge ordinary tartar of the same thickness, especially when the enamel-surfaces are roughened, containing pits and fissures. One most effective and convenient agent to use is a deterrent powder, of which there are several; fine pumice, powdered Arkansas stone, flour of emery, Tripoli powder, etc., moistened and used on strips, wooden points, and with brushes. The engine, with its ready appliances of small brushes, wheels of moose-hide, rubber cups, wooden points, disks, etc., will reach nearly every surface and perform the work rapidly. Probably the most practical and universal of the powders is fine pumice. A good wheel for flat surfaces is moose-hide. Rubber cups reach many difficult places, and are effective because they carry the powder much longer. Narrow polishing strips, with thin cloth backs, cut to a point at one

end, passed between the teeth near the gums, charged with powder, are good for approximal surfaces. In cases of uneven surfaces of enamel, coarse pumice can be used to good advantage, as it will enter deeper into pits and depressions. Still, with all the above-named appliances, the stain cannot be readily removed from inaccessible surfaces. After experimenting with many agents, I have adopted pyrozone, three per cent., with which to moisten the powder, and, in extreme cases, add one or two drops of phosphoric acid, used for cement fillings, to a teaspoonful of moistened pumice. A tumbler of warm water, containing a little carbonate of soda, is good for rinsing the mouth.

As a bleachant from within the tooth, pyrozone seems to be the only thing now known to the profession that will restore, with any show of permanency, a pulpless and, therefore, (*therefore* in a majority of cases), discoloured tooth to a shade approaching that of its ante-pulpless days. This property of pyrozone has been taken advantage of pretty generally, and discussed to that extent that nearly, if not quite everything, claimed for it is conceded.

As a decolourizer from without, less is known, and as a consequence, less is said of it. The removal of stains (green or other) mechanically involves or necessitates the loss of more or less of the tooth, robs the superficial portion of its fine structure and lustre, and prepares the way for a speedy return of a deeper dye, with repetitions of the process of removal until the child has outgrown the conditions of which green-stain is simply an indication, and of no more consequence *in itself* than red stain or blue. To avoid this mechanical mutilation, which is urged chiefly because of the offensiveness of the stain to the eye, two, of what appear to be purely chemical processes, have been resorted to:

1. The application to the stained surface of iodine followed by weak aqua ammonia (or aromatic spirits), repeating the applications at the same or a subsequent sitting until the stain disappears.

2. Removal of oily deposits from the teeth by the application on cotton of ammonia or bicarbonate of soda, followed by clear water, and this by twenty-five per cent. pyrozone, well rubbed in with cotton or a leather buff, followed in turn by soda, to neutralize the slight acidity and mitigate the occasionally caustic effects on the softer tissues. This latter treatment is effective to a remarkable degree, usually accomplishing its purpose promptly and always without injury to

the teeth, either as to structure or lustre, which we have demonstrated repeatedly as well out of the mouth by immersing teeth in caustic pyrozone for periods of two weeks at a time.

In case the enamel is roughened and dissolved nearly through to the dentine, a stone wheel, fine grit and broad face, will give a better surface by grinding the prominent portions down, which will lessen the depression. In the event of sensitiveness, it is better to make two or more operations, leaving the surface polished each time. To reach deep pits, the small brushes used with the engine do nice work; by cutting them back one-half the length and to a point, they are better than wooden points to hold the powder.

B. Agents acting preventively. Leaving out the *primary cause*, prevention consists in so changing the conditions as to prevent secondary deposits. The two most prominent conditions favouring green-stain are roughness of enamel and uncleanness, or neglect to remove that which ultimately produces it. After a case has been treated as above mentioned with ordinary care in brushing, and the use of a dentifrice, there is seldom any recurrence. With the habit of neglect which allows the deposit, one lesson in prevention will not always be sufficient, although the patient may think the instructions have been followed. It is much like removal of tartar; by care it can be prevented from any considerable lodgment; by neglect it accumulates. Usually when a patient calls for a removal of the pigment, both density of the enamel, and understanding how to prevent a recurrence are greatly in favour of success.

C. The proportion of the recurrences of the stain and of decalcification around fillings, and whether one filling-material acts more beneficially than others.

The proportion of recurrence is determined by the attention given to instructions. With young children and no one to see that the teeth are cared for, we would look for a large percentage of recurrences. With proper care quite opposite results would follow.

Decalcification around fillings.—I am not prepared to say that the colour has anything to do with disintegration of the enamel. We find that condition both with and without the pigment. Usually both conditions are results of allowing food to remain confined by the lips to undergo fermentation with its attendant consequences.

So far as my practice is concerned, in either case gutta-

percha is best for young teeth, even if renewal is necessary, until the dentine becomes dense. Gold may be safely used as inlays; a thin plate of gold cut to fit the cavity, the under surface being raised to sharp points with a grayer and set with cement, gives perfect satisfaction and is durable, while a gold filling would prove an injury. The most satisfactory fillings, when done, are porcelain inlays inserted in like manner.

The Dental Cosmos.

ON THE ACTION OF PURGATIVE MEDICINES ON THE DIFFERENT PORTIONS OF THE INTESTINAL CANAL, WITH A VIEW TO REMOVE NERVOUS AFFECTIONS AND TIC DOULOUREUX.

By Sir CHARLES BELL.

The opinions which some of the most influential members of the profession have advanced on the subject of neuralgic pains, tempt me once more to recapitulate shortly the distinctions in affections of the nerves of the face.

1. Crowding of the teeth, diseased alveoli and gums, disease in the antrum, will produce pain in the face resembling *tic*,—the rationale being, that disturbance and irritation on an internal nerve will produce pain, referable to the more superficial branches of the same nerve.

2. Disease of the bone through which the fifth nerve passes, or a tumour which involves the nerve in any part of its course, will give pain attributable to the extremity of the nerve, or to the part supplied with its extreme branches.

3. Disease in the nerve itself will produce excruciating pain, referable to the part supplied with its extreme branches.

4. In the true *tic douloureux*, there is no disease of the nerve, nor of the surrounding parts.

With respect to the first class, I have lately had an illustrative instance. Some of our dentists, in supplying defects, fix the false teeth in such a manner that they cannot be regularly removed and the gums brushed. The gums, no longer exposed to pressure as in their natural condition,

become spongy and inflamed, and rise over the teeth. I was called to consultation on a lady in this condition. She made no complaint of her mouth, but of lancing pain in the cheek and temple ; and hearing much of tic, she had no doubt of her martyrdom to that disease. The symptoms not resembling those of the true disease, I prevailed on her with some difficulty to show me her mouth. It was in a miserable condition. On making her remove the case which covered the gums, and unfortunately protected them from the brush as well as the natural pressure in mastication, they had become diseased ; they were spongy, fungous, and offensive. The remedy was obvious ; and the pains left her as soon as the gums and teeth were restored to a natural state, by the very simple means of a tincture of myrrh and camphor, and the use of the brush with chalk. Before this she had forsaken company and retired in despair.

I cannot resist contrasting with this an instance of the true tic in the face. I was in consultation with my nephew, Mr. G. Hamilton Bell, on the case of a lady, who presented a very singular character of countenance. Although not old, the whole range of teeth of both her jaws had been drawn : and consequently, she looked prematurely aged.

The singular circumstance in this case was, that although suffering from tic douloureux, when one or two teeth were pulled she had relief : so in course of time they have all been pulled. And now, although teeth, and alveoli, and gums, are all gone, the disease continues. The truth is, that any violent impression will assuage the pain, and fortify the nerve against the remote irritation on which the true neuralgic pain depends. This I believe to be the reason why surgeons continued for so long a time to divide the infra-orbitary nerve, because it gave temporary relief. It may also account for the effect of galvanism in this disease.

With respect to the second class of cases, where the nerve is irritated by passing through diseased bone, the reader may consult a paper on *tic douloureux*, by Sir Henry Hallford, in the Transactions of the College of Physicians. In that paper, the author describes the disease as produced by the affected branches of the nerve, passing through the foramina of the skull, and being there surrounded by dead or carious bone. But, with all respect, I am bound to say, that however severe the pains may be in the extremity of the nerve in such cases, they differ from those characteristic of the true tic ; and for

a very obvious reason, the cause is continual, and the remission of pain imperfect.

As to the third class of pains in the face,—from disease in the nerve, or a tumour involving it; the distinguishing character is not only the imperfect and occasional, and slight remissions of pain; but such a case will always be distinguishable from tic, by the numbness or total insensibility of the parts to which the nerve is sent. For example, there is insensibility of the cheek and side of the tongue, whilst it is to these parts that the patient is assigning all his torment. The distinction will be confirmed, if the tumour is seated at the roots of the nerve, by the wasting of the muscles supplied by the fifth nerve.

The painful affection of the face described by Fothergill, and since called *tic douloureux*, does not affect the function of the nerve; in the interval of pain, the parts supplied by the nerve possess their natural sensibility. The nerve is not morbidly affected. It is influenced by remote irritation; the pain is infinitely more severe, while it lasts, than that produced by the morbid condition of the nerve itself, or of the surrounding parts involving it: and the relief in the intervals of the paroxysm is perfect.

It is this latter circumstance which forces us to look for the cause of pain in the remote organs; whilst the long continuance of the disease without giving rise to morbid structure, imposes the belief that it is owing to disordered function only; and this is confirmed by cures being made through very simple means. That the effects of remedies are not constant should only excite us to further inquiry.

The derangement of the first process of digestion in the stomach, produces many affections of mind and body. But taking the single instance of flatulent distension with spasmodic closing of the orifices, it will produce pain as if the sternum were rent, pain in the axilla and mammæ, and down the side of the arm.

2. Disorder and distention of the duodenum will produce pain, referable to the lower angle of the scapula.

3. Accumulation in the colon, and consequent disorder, gives pain in the loins, spermatic cord, and groin.

4. Disease of the rectum produces pain in the testicle, the lower part of the scrotum, and inside of the thigh.

5. And disease of the anus, ulceration, piles, and fistula will be sensibly felt in the schiatic nerve.

These pains, comparatively external, may be reduced to a

law, viz. that irritation on the internal branch of a nerve, by disorder of function in the viscera, will be felt or attributed to the external branch of the same nerve. It is the same law by which inflammation of the liver will be recognised in the pain of the shoulder.

But I proceed further, believing that irritation in certain parts of the canal, produces neuralgic pains in more remote parts, and that one character of these sympathetic pains is their recurrence depending on the process of digestion.

These considerations bring me to my subject : which is the effect of purgatives in curing remote and irregular neuralgic pains.

In the first place we must recollect that the abdominal viscera are not merely incidentally collected and grouped. They are not allied by mere juxtaposition, but are as intimately bound together by nervous relations as the heart and lungs in the thorax, or the brain and the organs of the senses.

There is no disorder of stomach or bowels strictly local or limited. The various secretions which are poured into the canal, into the stomach, or duodenum, are furnished under the influence of the canal, and are as necessarily deranged as the action of the bowels themselves, when under irritation. The mere evacuation of the bowels appears to remove many disorders : but evacuation implies not only the muscular action of the canal, but vascular excitement, and the pouring out of secretions from the mucous surface ; and more than that, from the subservient glandular viscera. Such a view implies purging into the intestinal canal ; the relief to secretions which are pent up. If we look to cases,—and more especially those which are called Nervous Affections—the cure has been preceded in many of them, not merely by the discharge of the bowels, but by dark and fetid evacuations, in quantities to make the practitioner express his surprise from whence it came. These are attended with a subsidence of the tension of the upper part of the abdomen, and relief of sensations, difficult to express, in the præcordia. Such are the considerations which impose upon the physician the use of certain medicines, which we may call alteratives, or what we please,—but essentially, they are those which operate on the secreting organs,—those which pour their contents into the intestinal canal. Then it is, that free evacuations, by purgatives, have such surprising effects as authors delight to dwell upon.

With respect to these neuralgic pains, circumstances have

impressed upon me the belief, that the true tic, though remotely seated in the branches of the fifth nerve, has its source in the intestinal canal.

I do not offer the croton oil as a specific in this complaint : but its effects have been so remarkable as to afford a ground of argument. I ordered it at first in desperate circumstances in the most severe case of pain in the cheek ; and the effect being immediate, the relief perfect and permanent, I should have been to blame had I not followed the practice in similar cases. In very many it had the same happy result.

What then, I may ask, would be the conclusion of any enquiring mind, when he found a peculiar purgative acting powerfully, but not more powerfully than other forms previously given, attended with immediate and permanent relief of symptoms ? Mine, I confess was, that it acted directly on that portion of the canal, the irritation of which, or as Mr. Abernethy would have said,—“the discontented state of which” produced the remote pain.

I have referred to a patient who had been subject to tic douloureux, and who had been more than once cured of his pain by croton oil, having died last autumn. There was no disease in the nerve, but ulceration was found in the mucous coat of the ilium. But then it is said in the report conveyed to me, that he had been too powerfully dosed with this medicine. I take the facts either way ; the ulceration was the cause of the *tic*, or the ulceration was occasioned by the medicine. In this last supposition, we have the important admission, that croton oil improperly used, will act on a portion of the mucous coat to the formation of ulcer. Could we depend on this reasoning, it would explain how the better regulated administration of the medicine did, in very many cases, affect a portion of the intestine to the removal of morbid irritation there.

Reviewing my experience, I think I am borne out in believing, that the disturbed function of particular parts of the intestinal canal gives rise to pains differing in their apparent places according to the portion of the canal irritated. Here I conceive there is a wide field for enquiry. If the intestinal canal is estimated at seven times the length of the body : and if it be also acknowledged, that the different portions of this long tract of mucous membrane perform distinct offices, and are subject to different influences, there is nothing to repel the idea, that those portions being in a condition of

disturbance and irritation, shall produce a variety of symptoms, especially differing in their apparent locality.

And this view is countenanced by the effect of medicine. We can throw the influence of evacuants on the different portions of the canal,—affect the stomach, the duodenum, the long intestine, the colon, or the rectum. Thus is each portion of the intestine proved to be distinct in office, and to possess distinct affinities.

It is on this principle that we ought to pursue the enquiry, —*first*, on what part of the extended canal does this secret disturbance fall ; and, *secondly*, what form or combination of medicine shall especially touch or influence the part affected. We have an instance in the effect of the croton oil. Let us not call it a specific, but seek for other remedies, on a just and scientific principle.

REPLANTATION AND TRANSPLANTATION OF TEETH.

An interesting paper on this subject was read by Dr. Benedikt at a meeting of the Army Medical Staff at Budapest. He said that Ambrose Paré was the first who performed replantation of teeth, and was followed by Dupont and Pomaret, the latter of whom recorded a case where a tooth which had been extracted by mistake was replaced and eventually adhered. Weld has performed eighty replantations, among which two have failed, and he also proved by experiments on dogs that absolute integrity of the periosteum is one of the most important conditions of a permanent adhesion of the tooth. By replantation Dr. Benedikt means an operation by which a tooth is inserted into living tissue, with which it must enter into nutritive communication. He distinguishes between replantation and transplantation, the latter consisting in the transference of a tooth from one person to another. In his experiments he appeals to Professor Scheff, who extracted teeth of dogs under anæsthetics and with antiseptic precautions, the teeth being placed in a solution of sublimate. The wound was then disinfected, the bleeding was arrested, the coagulum was removed from the alveolus, and the tooth which was to be replanted was pressed

into the cavity. After two days a reddish border was to be seen, and the tooth could be moved backwards and forwards, but after two weeks it was securely fixed. According to Dr. Benedikt the indications for the above operation are loosening of the teeth, caries, and inflammation of the periosteum surrounding the root. A tooth which has been removed from its socket by mistake on the part of the dentist or by violence should be replanted. In the case of toothache from caries where it is impossible to apply any remedy to the painful place the tooth may be extracted, filled with stopping after removal, and then replaced. Dr. Benedikt proposes that the tooth should be carefully extracted, avoiding injury to the socket or the surrounding gum, for a fracture of the alveolus would render subsequent union impossible. The root is then to be trimmed as far as it is rough and eroded, and the tooth is to be replaced after the removal of the pulp and the disinfection of both tooth and alveolus with sublimate. The operation is followed by no great pain and by only a trifling inflammation of the gums.

The Lancet.

A NEW COMPANY.

DENTENAX (HOLDFAST-TOOTH) COMPANY, LIMITED.

Registered October 9th ; capital £11,000 in shares of £5 each. Objects : To acquire patents or inventions relating to artificial teeth, or of any materials, apparatus, &c., connected therewith, and to carry on the business of manufacturers of and dealers in artificial teeth ; chemists, druggists, drysalter, &c. The number of the directors is not to be less than three nor more than five. The first are : Thomas J. Barratt, of 71, New Oxford Street, London, W.C. ; Alexander T. Hollingsworth, of 35 and 36, Bedford Street, Strand, London, W.C. ; Heedley N. Backhouse, 5, Rue de la Paix, Paris ; John S. Campbell, dentist, of 22, Rue Dumont d'Urville, Paris, and Edward Praill, of 3, Park Road, Haverstock Hill, London, N.W. Qualifications for office, the holding of £250 in shares or stock. Remuneration, the sum of £500 per annum to be divided between them as they themselves determine.

BEADED OR GROOVED VULCANITE DENTURES.

By scraping a groove across the palatal portion of the plaster model and along the buccal and labial lines of muscle attachments, to form a bead inclosure will produce a supplemental chamber-like function of nearly the entire inner surface of the denture.

The result is a greatly increased retaining hold of the plate on the gums; especially noticeable in cases having flat and soft surfaces.

Partial dentures may thus be securely retained, and the simplicity of the process is hardly less remarkable than the successful result. It is only essential that the scraper shall be shaped and operated to produce a suitably smooth, narrow, half-round groove in the model, and follow previously studied lines along the palatal soft parts and at the merging of the muscles in the gums. The inclosures may be of any size or shape or number that a careful pre-observation of the character and conformation of the mouth may indicate. If experience proves that the beading is too prominent at any point, ready relief may be obtained by smoothly reducing the projection at that point; but first allow time for the settling of the denture before taking off portions of the bead. In most cases, no "chamber" will be required other than the beaded enclosure and this is a matter of considerable importance when a shallow vault and short teeth make a thin plate necessary for the proper production of speech.

In some instances an alternative cutting of grooves in the vulcanized plate may be indicated, and that can readily be done with a round or oval engine bur, taking great care to smooth the edges of the grooves. These are especially effective in lower dentures, which may thus be given a really adhesive hold in cases otherwise most difficult of retention. When grooves are employed, strict cleanliness must be earnestly enjoined, else the foul grooves will become a source of irritation, a defect not incident to properly formed beads.

If for any reason a "chamber" is deemed desirable, it can easily be made, after vulcanization, by deepening the bead-inclosure with an engine bur.

ARCH OR SPAN FILLING.

By Dr. W. A. MILLS, of Baltimore.

He described his method as follows: Take, for example, two superior bicuspid teeth which have a space the sixteenth of an inch between them. I wish to fill with gold. In this case I have cavities on the proximal surfaces, otherwise I would make them. Prepare cavities as though they were to be filled separately. Be sure to make the anchorage as strong as possible as they become the abutments of the arch when completed. Set an orange-wood wedge firmly between the teeth. Bind teeth firmly together with German silver wire to prevent any spreading of teeth during the packing of the filling material. Fill space with oxyphosphate mixed rather stiff, forcing sufficient cement over and against the buccal and palatine surfaces of the teeth to form a matrix. Before the cement sets too hard, remove it from cavities in the teeth, and a sufficient amount from the space to give proper form to the arch, buccal and lingual surfaces of the filling, then proceed to fill as though it were a single cavity. When filling is completed, remove rubber dam, matrix wedge, and binding wire then polish filling. With an amalgam filling the same process is used except that gutta-percha is employed in place of the oxyphosphate and this and the binding wire are not to be removed until twenty-four hours afterward when the filling can be dressed and polished.

I do not recommend these fillings only when necessity demands.

The Dental Register.

PORCELAIN AMALGAM CROWNS.—Dr. V. Nuki, of Temesvar, Hungary, makes a very simple crown. He prepares the root the same as for any crown, then takes an impression and grinds a plate or rubber tooth to fit. With pivot and tooth in position, he packs a good amalgam around the pins and pivot and builds up palatine part of crown; when the amalgam is hard, he polishes it and cements it into the root. These crowns can only be used for bicuspids.

Correspondenz Blatt.

Dental News.

FAILURE OF A DENTAL SURGEON.

A meeting of the creditors in the matter of Abraham Berlyn, dental surgeon, now residing at 76, Gough Road, Edgbaston, and carrying on business at 11, Bennett's Hill, 77, Summer Hill Road, Birmingham, and 1, High Street, Stratford-on-Avon, was held at the office of the official receiver (Mr. Luke J. Sharp), Colmore Row. Mr. Woollett presided.

Debtor's statement of affairs showed liabilities to the amount of £2,424 17s. 6d., and assets £77 5s. 9d., deficiency £2,347 11s. 9d.

In his observations on the case, the Official Receiver says that up to 1892 the bankrupt was engaged as a dentist's assistant. In January, 1892, he commenced without capital as a dentist, at 27, Paradise Street. He remained there until September, 1893, when he purchased the business carried on by a Mr. A. W. Whitehead, at 11, Bennett's Hill, and 1, High Street, Stratford-on-Avon. He agreed to pay £875 by instalments extending over a period of five years. The amount now due to Mr. Whitehead is £600, and he retains the lease of the premises in Bennett's Hill as security. To enable the bankrupt to pay the expenses of removal and buy furniture, &c., he borrowed the sum of £160 from Messrs. Pepper and Tangye, upon security of two life policies and a charge upon present and future book debts. On August 1, 1894 a Mr. A. Britton joined him in partnership, and paid £450 for a share in the business. In February, 1895, the bankrupt borrowed £100 from a Mr. Hull, and gave him a charge upon the book debts in existence at that time. He did not inform Mr. Hull of the assignment to Messrs. Pepper and Tangye. On April 18, 1895, he borrowed £33 from a Mr. Robert Barrett, and gave him a bill of sale upon some of the effects as security for the repayment of the principal and interest at 25 per cent. In May, 1895, he borrowed £50 from Mr. C. U. Jagger, and assigned a debt as security. In the same month the bankrupt purchased the goodwill of a business at 77, Summer Hill Road, for £40. The business was managed by a Mr. Thomas, who claims the greater part of the furniture there. One room was furnished by the bankrupt with furniture supplied on the hire system, towards

which he paid £2. The furniture was removed by the owners on the day the receiving order was made. At the commencement of August the bankrupt borrowed £50 from Messrs. J. D. and E. T. Kerr. On August 16, 1895, the partnership with Mr. Britton was dissolved, and Mr. Britton left the concern, receiving £350 as his share of the capital. Messrs. Kerr advanced the bankrupt the amount, and the bankrupt states that a provisional agreement for a partnership was executed, by which Messrs. Kerr were to receive one half of the net profits. The bankrupt did not inform them of the different securities he had given to creditors and stated the liabilities of the firm were only £65 without disclosing the fact that he had considerable private liabilities. The bankrupt states that on August 18 he wrote Messrs. Kerr that he was pressed by creditors, and asking if they would help him. On the following evening Mr. E. T. Kerr and his then solicitor went to the bankrupt's house and told him they did not intend to proceed with the proposed partnership, and they were willing to take over the business in satisfaction of the £350 and £50 before referred to. A deed was accordingly executed by which the bankrupt assigned his interest in the goodwill and business at Bennett's Hill, and also the book debts. A further deed was signed by which the bankrupt was to be employed as manager. Although the businesses in Stratford-on-Avon and Summer Hill Road were not mentioned in the deed, the bankrupt undertook not to practise within 30 miles of Birmingham for six years, but how he was to carry on business at those two places, the Official Receiver was at a loss to understand. As this assignment was executed only a few days before the petition it appeared to him to call for enquiry with the view of ascertaining whether it amounted to a preference, or an act of bankruptcy. On August 22 an execution was levied, and the effects were advertised to be sold by auction. The bankrupt then consulted his solicitor, and the present proceedings were instituted. The furniture at Gough Road is claimed by the trustees under an antenuptial settlement, dated March 14, 1893. The insolvency is attributed to want of capital, borrowing money at a heavy rate of interest, and becoming surety for a friend for £200. According to the statement of affairs there are 31 creditors for money advanced to the bankrupt, whose debts amount to £2,131 5s. It was agreed that the Official Receiver should be appointed trustee.

Mr. Woollett asked if there were any questions to ask the bankrupt.

Mr. Cross said there were many serious questions, but the public examination, he suggested, would be the better place to put them.

Mr. Jaques (who also appeared for a creditor) said his client parted with his money to the bankrupt on consideration of £400 book debts, which were represented to be good. They had given notice to the debtors, and had only been able to collect £1 7s. One gentleman who was applied to replied through his solicitor that he did not owe any money at all. What the creditors had got to fight for was practically the proceeds of the sale of the chattels.

Mr. Pepper said Mr. Jaques's account of the value of the debts was only too true. His firm also sent out notices to a large number of creditors whose names were included in a list supplied by bankrupt, and a large number repudiated the debts, one gentleman stating that he had never been in bankrupt's office.

Mr. Reid (a creditor) said bankrupt got an advance from him on the representation that a certain purchase was to be completed on November 27, and if he did not get the money by 12 o'clock that day the purchase would slip through his fingers. If there was no purchase, then the money was obtained by false pretences, and he asked if it was within his power to prosecute bankrupt for obtaining money by false pretences.

Mr. Woollatt: You must seek advice; I am not a lawyer. It would be a matter for consideration, he added, whether the facts would be laid before the Public Prosecutor.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

The following were the written questions in the examination for diploma in dental surgery, now being held.

ANATOMY AND PHYSIOLOGY AND SURGERY.

November 8, 1895. 2 to 4 o'clock, p.m.

N.B.—The Candidate is required to answer at least one of the two questions, both on Anatomy and Physiology, and on Surgery and Pathology, unless he is entitled by the Regulations to exemption from any of those subjects.

Anatomy and Physiology.

1. Give the origin, insertion, nerve-supply, action, and relations of the Temporal Muscle.
2. Describe the process of digestion of a piece of meat, fat and lean.

Surgery and Pathology.

3. Give the pathology, symptoms, and treatment of Epulis.
4. What are the means for arresting hæmorrhage in an incised wound? Specify any conditions, constitutional or other, which tend to make bleeding more troublesome than usual, and state what steps you would take to arrest such hæmorrhage in the case of bleeding from the socket of an extracted tooth.

DENTAL ANATOMY AND PHYSIOLOGY AND DENTAL SURGERY.

5 to 8 o'clock, p.m.

N.B.—The Candidate is required to answer at least two of the three questions, both on Dental Anatomy and Physiology and on Dental Surgery and Pathology.

Dental Anatomy and Physiology.

1. What is meant by adaptive modification with regard to the dental organs? What are the agencies by which such modification is brought about? Give examples.
2. Describe the development and calcification of the cementum in the Mammalia. Mention the different positions in which it is found.
3. Describe minutely the dentine papilla; give its origin, development, and subsequent history.

Dental Surgery and Pathology.

1. How would you treat caries in the temporary teeth (*a*) without exposure of the pulp, (*b*) with exposure of the pulp, (*c*) with abscess?
2. What is an Odontome? Describe the different varieties. How can an Odontome be diagnosed from other tumours?
3. In what cases, in what strengths, and under what precautions would you employ the following drugs in the mouth:—

- (a) Perchloride of Mercury,
- (b) Peroxide of Hydrogen,
- (c) Aconite,
- (d) Iodine,
- (e) Carbolic Acid,
- (f) Arsenic,
- (g) Chlorate of Potash,
- (h) Nitrate of Silver.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents.]

CROTON OIL IN TIC DOULOUREUX.

To the Editor of the "British Journal of Dental Science."

Sir,—I plead guilty to being a bit of a book-worm, and one of the phases of this disease which seriously affects me is a leaning towards the twopenny compartments of the ordinary bookstall. I will not weary you with a recountal of the disasters which have sometimes resulted from a yielding to temptation, but at one infective focus, which I pass on my way to catch the evening train, I found a volume of essays by Sir Charles Bell, which I send for your inspection. It has interested me much, and I thought that you, and the readers of the JOURNAL, if it seems fit, should share the "find." Perhaps some of our older practitioners may know of cases of *tic* being treated by the administration of croton oil, but I imagine that this method is quite old-fashioned. Sir Charles, you will see, was of opinion that this dreadful disease was due to an abnormal condition of some portion of the intestine, and whilst not offering croton oil as a specific in this complaint, he says its effects were so remarkable as to afford a ground of argument for his Essay.

Even if the author's arguments do not satisfy you, I think you will agree that his style and diction have a certain charm, and his accompanying remarks on Neuralgias are of interest to the dentist.

Yours, etc.,

BIBLIOPHILE.

London, Nov. 2nd, 1895.

APPOINTMENT.

Mr. F. J. Whitehead appointed Hon. Dental Surgeon to the Smallwood Hospital, Redditch.

Dental Hospital Report.

WORK DONE at the Victoria Dental Hospital of Manchester,
during the month of Oct., 1895.

Number of Patients attended	923
Number of Extractions	526
Number of Extractions under Anæsthetics	364
Gold Stoppings	75
Other Stoppings	83
Miscellaneous { advice, temporary fillings, scalings, dressings, &c.	314
Crowns	7
Irregularities	7
Total	1376

J. BUTTERWORTH, *House Dental Surgeon.*

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
6. The Journal will be supplied direct from the office on PREPAYMENT of subscription as under:

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British Journal of Dental Science.

No. 669. LONDON, DEC. 2, 1895. VOL. XXXVII.

THE MECHANICAL TRAINING OF THE DENTAL STUDENT.*

By WM. SIMMS, L.D.S.I.

Gentlemen,—My first duty is to thank you for electing me President of our Society; an office I might well have hesitated to accept but for the confident expectation of the hearty support, not only of the members of the Council, but of the whole Society. But visions of a spectre called a “Presidential Address,” which has hovered around the last few months, has impressed upon me the recognition of the fact that there are limits even to your good nature, though even in regard to this, it is a pleasant and stimulating thought that though one may not count upon your active help in writing the address, a generous and considerate hearing will not be refused.

I cannot enter into a consideration of the subject matter of this paper without making a passing reference to the death, since we last met, of our time-honoured leader, Sir John Tomes. The record of his life is inextricably and honourably interwoven with the progress of the Dental Profession in England. It was largely due to his wonderful pertinacity of purpose, and unselfish devotion of time and ability that the examination for the Dental Licentiateship of the College of Surgeons of England was granted; and from which initial step much of the progress in the path of dental reform has been made.

*Presidential Address delivered before the Manchester Odontological Society.

Such a record would have sufficed to make the name of Sir John Tomes honoured amongst us, but when to this record we add the marvellous one of his scientific researches, valuable not only in themselves but because they created in others the same spirit of scientific enquiry and research, then do we more fully comprehend that we have lost indeed a "Master in Israel." In the fulness of his years he has been gathered to his fathers, and we sincerely mourn his loss. To few men is it given to so fully accomplish the purposes which they set out in life to attain, or to see the unselfish hopes they cherished and laboured for so abundantly realised.

Gentlemen, there is no finality in dental progress, any more than in the progress of the human race, and our profession as others must adapt itself, not indeed fitfully or hastily, but methodically and surely to the ever changing needs of the times. The work accomplished in the past under great difficulty and discouragement, must stimulate us to still greater achievements, and prove us to be not altogether unworthy followers of the men whose names and deeds are the precious heritage of the dental profession.

I propose to discuss in your hearing to-night, the subject of "The Mechanical Training of the Dental Student"; a subject which may truly be said to be of pressing importance and well worthy the serious consideration of the members of this Society.

The dental profession,—itself a child of yesterday, has made such phenomenal progress in many directions, that we who have lived through the period of marvellous transitional changes, need, so to speak, to stand still and look back before we can realize all that has been happening, or judge of the effect of the educational changes inaugurated by the College of Surgeons of England. Just as the summit of the mountain is lost to the view of those in close proximity to it, so we by our association with important events which have

been taking place in our own time may fail to estimate their real importance or may even be tempted to deny their existence altogether.

Fifty years ago and less, the art and science of Dentistry consisted almost entirely of the extraction of teeth and the construction of artificial substitutes. The character of this latter work called for high constructive skill and mechanical ability. It was largely the personal work of the principal, and the absence of the useful dental depot, compelled even the construction of many of the necessary tools and appliances used in the workroom.

Private pupilage under such conditions had some solid reality about it, for only as the pupil acquired ability in this direction was there hope of any successful career being open to him, for if he were unable to construct artificial teeth what other resources in dentistry were available. Moreover the former apprenticeships extending as they usually did to five, or sometimes seven years gave a sufficient opportunity of becoming thoroughly proficient in the work of the mechanical dentist at any rate, while doubtless the surgical side of the student's education, was in a large measure neglected. In a paper read by Sir John Tomes at the International Medical Congress held in London 1881, he observes that in the days preceding the era of dental education "dental practice was approached from two wholly different sides, and resulted in the production of practitioners of two distinct classes; the one competent to advise, the other competent to treat, but neither fully competent both to say what should be done, and to do it effectively."

Much has been done to alter such a state of affairs, but as regards the mechanical education of our students, have we not gone back rather than advanced.

Is it not true that many of our students who come to our Hospitals after spending two or three years with a Dental

Practitioner, acquiring a knowledge of the details of mechanical dentistry exhibit a woeful ignorance of these details, and is it not further true that many of our Licentiates in Dental Surgery start out on their professional career with a knowledge of these details still to be obtained.

That I am not overstating the case I quote from a paper read by Mr. A. J. Watts, the head of the mechanical department of the Dental Hospital of London. In a paper read at the Birmingham Meeting of the British Dental Association in 1893, he says, "from experience I have had at the Dental Hospital in Leicester Square, I am enabled to say that out of upwards of 200 students with whom I have been daily associated, only 14 per cent. could be called really good mechanics, about 46 per cent having a fair knowledge, thus leaving nearly half having only a slight insight in these principles, an accurate knowledge of which is so necessary to ensure success in after life." And in the same paper he makes an observation which is eminently true, viz. "that the best mechanicians make the best operators" This lack of knowledge of the underlying principles of Dental Science has been no small factor in creating and continuing in existence the advertising charlatan whose tenure of existence will become more precarious as the legitimate practitioner is in the widest sense equipped for his work.

I hope I may take for granted the postulate that dental education on its mechanical side should be taught as thoroughly as on its operation and scientific sides, and that an attempt should be made to combine into a harmonious whole the varying aspects of dental knowledge which are now seldom seen united in the same person. We all sympathise with and may well encourage the desire to possess so called higher qualifications, but if these are to be obtained at the expense of practical qualifications, then our system of education will produce men excellent and educated in many direc

tions, but men who considered as dentists, are sadly uneducated.

There have been occasionally feeble attempts to depreciate the importance of the mechanical training of the dentist, but you will, I hope, agree with me that the dental practitioner ought not to be at the mercy of his mechanic, if he is fortunate enough to be able to afford one, but that he ought to be the master of the whole situation. It is only necessary to remind you of the development of bridge work and crowns to show how indissolubly mechanical and operative dentistry are joined together.

We have so far progressed with our argument to show,—

1st. That the results of our present system, or want of system of mechanical training are unsatisfactory.

2nd. That mechanical dentistry needs to be efficiently taught, and I now desire in the 3rd place, to show that our system of private pupilage is partly responsible for the present unsatisfactory condition of attainment in mechanical knowledge. In this connection it is well to remember the changed and changing character of dental practice. The practice of conservative dentistry occupies a large share of the time of the dental practitioner as compared with 20 or 30 years ago. Mechanical work while *actually* more important than ever before, is *relatively* less so. The time the principal spends in his workroom is less than formerly, and may be less in the future than now; he is therefore unable to give the same personal supervision to the training and instruction of his pupils in mechanical dentistry as formerly. Again, only a small proportion of dentists are qualified to instruct, even if they have the knowledge and the time to do so.

The art of teaching is a rare one, and requires the combination of many faculties only occasionally found in one person. This is true of the teaching profession itself, where men are trained to teach, it is much more true of such a

profession as ours, which of course includes men of wide and extensive knowledge, but much fewer men able to impart that knowledge to others. The necessities of everyday practice are also somewhat unfavourable to the pupils progress. A pupil requires to be taken by graduated steps along the pathway of knowledge, and even to retrace a step again and again until his position is made sure. A pupil needs not only to see a thing done, but the why and the wherefore need to be explained to him. Principles should be taught as well as practice. The work of a dental practitioner in his workroom is circumscribed both by his knowledge and methods of work, whereas an efficient system of education will embrace the best of what the many know. Private pupilage also entails an extravagant waste of time, and much more might, under a more methodical system be taught the student in two years than he now learns in three. This is a most important reason for desiring to improve the system, for the demands upon the dental student are not only increasing, but are likely to still further increase in the future.

We cannot reasonably enforce any scheme of dental education which goes beyond the twenty-first year of the student's age, and on the other hand the general educational requirements prevent, and rightly prevent the student coming to us till at least sixteen years of age. There remain to us, therefore, four or five precious years, which are only sufficient, if every portion of that time is taken the fullest advantage of.

No doubt private pupilage will remain, and must remain, for some years at any rate, an adjunct to our educational schemes, but what we desire to urge alike in the interests of the public and the dental profession is, in the first place, the voluntary provision of a complete dental education by the different dental educational Institutions, to be followed at a later stated period of a compulsory attendance at one or other

of these recognised Institutions, and consequent upon this the institution of an examination at the end of the second or third year of the student in the subjects related to Mechanical Dentistry. This examination might well include Chemistry and Materia Medica. I am well aware of the efforts now being made in several directions to provide an education in the subjects pertaining to Mechanical Dentistry, and with these efforts I am in sympathy. Mr. Cunningham is making a brave endeavour in London to establish a school where such an education can be obtained, and his effort to break through the present system, may well excite the interest of the profession. The project is much to be commended, but my own predilection would be for the closest association of dental mechanical education with the existing Dental Schools, for I believe that it is only by such a relationship that the students' time can be utilized to the best advantage, and the whole subjects of the pupils education kept within the purview of those most interested and concerned.

The following are some of the salient features of such a revolutionary movement which call for comment.

1st. The expense of such a scheme would be largely, if not entirely met by the fees of the students, which probably would be less than the average amount paid as premiums under the present system.

2nd. It would enable a curriculum of study to be arranged which would take the student systematically and gradually through the whole course of Mechanical Dentistry, including the taking of impressions and the fitting of dentures to the mouth. The curriculum might well include attendance at a technical school, of classes in wood carving, modelling, drawing and metal casting, which would be a most helpful addition to the usual instruction imparted to the student.

3rd. It would involve the provision of a dental workroom which would embrace the latest and best appliances, including

apparati for refining, melting and rolling metals, work in continuous gum, making of solder, amalgam fillings, &c., the making and tempering of small tools, &c., &c.

4th. It would enable the Lectures in Mechanical Dentistry to be given to the student during the course of the mechanical pupilage, and not as now at the end of it, and to that extent it would relieve the student during his final two years of hospital work.

5th. It would make it possible for the student during the second or third year of his mechanical pupilage, to proceed to the construction and insertion, under proper instruction, of crowns, &c., and also regulation cases, and would thus also relieve the student during the later two years of his studentship.

6th. It would involve the supply under proper restrictions of artificial teeth to necessitous people. From the point of view of the poor this would be of decided advantage, who need our help in this direction, no less than in work which is purely operative, and if the advantage of obtaining such work were restricted to the really poor there could be no objection from the dentist's point of view.

7th. It would enable students to have the advantage of the assistance of teachers well qualified to impart the knowledge of the various branches of Dental Art and Science. The education imparted to the student would be advanced and up to date, whereas under the present system it is frequently behind the times, and long out of date.

8th. Such a scheme of education would 'fall in with, and assist in the carrying out of any scheme for obtaining the conjoint diploma as well as the L.D.S., or for the obtaining of a higher dental diploma as advocated by our member Mr. George G. Campion.

No doubt there will be present in your mind objections to so radical a change in our method of training students, and it may be freely admitted that under the most favourable

conditions, and with exceptional students, the system of private pupilage has in the past, and might in the future produce men of capacity, fully equipped for the whole of the duties they are expected to discharge ; but as a whole the system which has had abundant trial has served its day and generation, and being weighed in the balance and found wanting, must ere long give way to the demands which present-day necessities imperatively require. In America the system of hospital training, less complete and satisfactory than that sketched in this paper has been carried out for some years, and the results in so far as concerns the mechanical education of the student will well bear comparison with the results produced by a different system in our own country.

It is in no querulous spirit that I have ventured to make this the subject of a Presidential Address. We have reason to be proud of the men who have led us in the past, and satisfied with the path along which they have led us. Our social and scientific progress has been satisfactory, and in some respects phenomenal, and we may be well content with past progress. But our satisfaction with past achievements is with the achievements *for* the past. The requirements of the *present* demand our attention, and *pre*vision is necessary in order that *pro*vision for the coming days may be made. The justification for our existence as a profession, and for the protection of the State will be found in the manner in which we discharge our duty to the public. The public of to-day is making large demands upon the capacity of the dental surgeon ; in the near future it will make greater, and it behoves us in a spirit free from apathy and selfishness to continue the work of dental reform and progress, so happily inaugurated by men, many of whom are still with us and whose pride it is to be numbered among the pioneers of that dental reform movement, the benefits of which have been extended so conspicuously to suffering humanity.

DENTAL MECHANICS.

By HARRY ROSE, L.D.S. Eng.

Lecturer on Dental Mechanics, National Dental Hospital.

PLATE WORK.

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(Continued from page 1022.)

The preparation of gold solders.

The following list shows the composition of various solders.

17 CARAT.	Fine Gold	10 parts.	Coin Gold	13 parts.
	„ Silver	1½ „	Silver	2 „
	„ Copper	2 „	Copper	1½ „
	„ Zinc	½ „	Zinc	½ „

16 CARAT.	Fine Gold	8 parts.	Coin Gold	10½ parts.
	„ Silver	1½ „	Fine Silver	1½ „
	„ Copper	2 „	Copper	2 „
	„ Zinc	½ „	Zinc	½ „

14 CARAT.	Fine Gold	6 parts.	Coin Gold	8 parts.
	„ Silver	1½ „	Fine Silver	1½ „
	„ Copper	2 „	Copper	2 „
	„ Zinc	½ „	Zinc	½ „

16 CARAT.	Fine Gold	30 parts.
	„ Silver	8 „
	„ Brass	7 „

SILVER SOLDER.	Fine Silver	10 parts.
	„ Brass	2½ „
	„ Zinc	1½ „

When making solder, the three metals, gold, silver and copper should be melted first, using for the purpose a clean fireclay crucible.

When in a state of fusion the remaining ingredient zinc is added, but to prevent immediate volatilization when it comes in contact with the molten metal, it should be wrapped up in

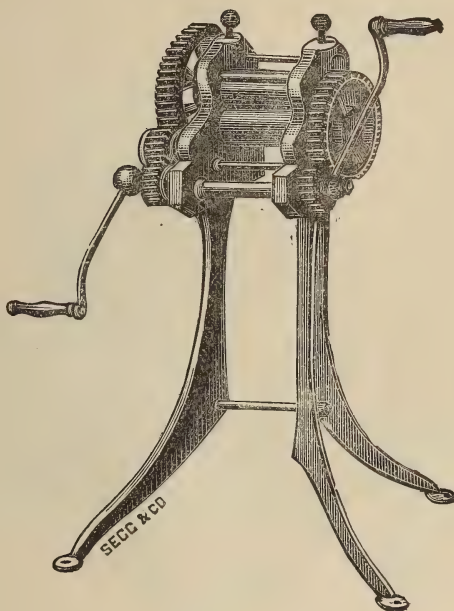


Fig. 4.

a little gold foil, and inserted into the crucible by means of a pair of tongs; the contents of the pot should then be immediately stirred with a tobacco pipe stem, previously made warm, so as to thoroughly mix the zinc with the other metals.

After remaining in a molten condition in the fire for a few moments, it may be poured into a suitable ingot mould previously warmed and oiled. It has now to be flattened or rolled, in the same manner as described for gold.

The rolling is accomplished by means of the flatting mills or rollers as shown in figures 4 and 5.

The space between the rollers which are made of hard, polished steel, is regulated by two set screws, which on being tightened after each introduction of the metal between them, reduces the gold or other metal to the required thickness, which may be ascertained by means of a guage-plate.

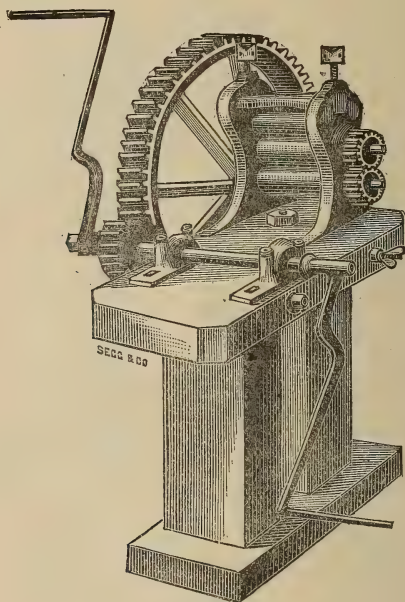


Fig. 5.

The guage-plate is a thin plate of steel having recesses cut in it, corresponding in width to certain standard thicknesses of metal ; these are numbered respectively 5.6.7.8.9. etc.

The rollers during and after use should be kept well oiled and free from dirt or grit, and care should also be taken that no flux is adherent to the metal before placing it between the rollers. If the piece of metal is to be made into wire it should be rolled until it is about $\frac{1}{8}$ of an inch thick, or a little larger

than the thickness of wire required, then annealed, and afterwards cut into strips $\frac{1}{8}$ square, by means of a pair of large shears placed in the vice.

The strips ought to be cut in the same direction as the gold was rolled, and before bending them straight, they should be annealed again.

It is usual also after straightening to smooth the edges of the strips somewhat, either with a file, or by hammering, and then one end is filed to a point to enable it to be inserted in the draw plate, for reduction to the proper size.

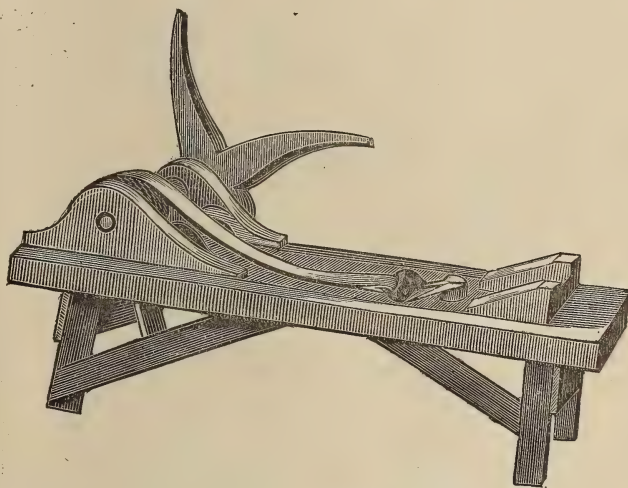


Fig. 6.

The draw plate (see section in "The Dental Laboratory,") is a steel plate about a quarter of an inch thick, perforated by a number of holes, gradually diminishing in size, through which the wire is drawn; the latter should be annealed at every third or fourth hole.

The drawplate when being used may either be placed in a vice, or on a draw-bench. If the plate is fixed in a vice a

pair of large pliers, or draw-tongs, may be used to pull it through the holes.

The draw-bench (fig 6) can be used when one has to draw thick wire.

With this bench, fairly thick wire can be drawn down with the expenditure of only a slight amount of labour-force, by means of the powerful arms seen on the left side of the figure. These arms are connected with a spindle, around which is wound a thick leathern band. To the free end of this band is attached the handles of a strong pair of draw-tongs.

The draw plate is placed at the back of and against the two buttresses formed by the two pieces of wood on the right of the figure and the draw-tongs are pushed in between the buttresses and made to grasp the wire as it is pushed through the draw-plate.

As tension is made on the straps by turning the arms, the handles of the draw-tongs are brought together and the wire is then gripped very firmly and drawn through the plate.

Wire that would require enormous force to draw it through a plate fixed in the vice, may be drawn down with ease by means of this bench.

(To be continued.)

PHOTOGRAPHY IN NATURAL COLOURS.—A further advance in the direction of preparing photographic prints in natural colours is recorded by E. Vallot, who appears to have proved the soundness of Wiener's theory that colours may be formed on films in which silver salts are replaced by other substances, each ray isolating the colour common to it and destroying the others. Solutions in alcohol are prepared of (1) Aniline purple, (2) Victoria blue, (3) turmeric. The finished solutions are mixed, the paper is allowed to float on the mixture and dried, then exposed to sunlight under a coloured glass positive for three or four hours. According to the *Amateur Photographer*, the results are encouraging, though perfection has not yet been attained.

ORAL SURGERY.

By EDMUND W. ROUGHTON, B.S., M.D. (Lond.), F.R.C.S.
Eng.

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(Continued from page 1017.)

TUMOURS OF THE GUM.

The term "epulis" is used in different ways by different authors. By some it is used to signify a growth situated upon the gum no matter of what nature ; by others it is limited to one variety of growth, viz., a fibrous tumour ; others again define an epulis to be a sarcomatous tumour originating from the bone or periosteum. It is advisable therefore either to discard the term entirely, or else to use it only in its topographical sense, prefixing an adjective such as fibrous, sarcomatous, etc., to indicate the nature of the tumour.

The following tumours are met with on the gum :—

FIBROUS TUMOUR.

A fibrous epulis may grow from the periosteum of the surface of the alveolus or from the periodontal membrane. It is composed of fibrous tissue and is covered by normal gingival mucous membrane. It is usually a small tumour, not much larger than a pea, but may, if allowed to grow unchecked, attain much larger dimensions, so as even to protrude from the mouth. It may be sessile or pedunculated. When growing from the surface of the alveolus it does not displace the teeth, but when growing from the alveolo-dental periosteum, the neighbouring teeth are frequently separated. Fibrous epulis often occurs in connection with carious teeth,

or with the stumps of teeth, and seems to be the result of irritation, but one often sees cases in which the teeth are perfectly normal. The most common situation of this form of growth is between the upper canine and lateral incisor. It is said to occur more frequently in women than in men. It grows very slowly ; a tumour the size of a pea may have

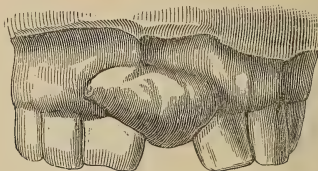


Fig. 34.—Fibrous Epulis displacing the adjacent teeth. (*Heath.*)

been noticed for a year or more. It does not recur after complete removal. It is painless unless it is large enough to come in contact with the opposing teeth, in which case it is apt to become ulcerated and give rise to a good deal of pain.

FIBRO-SARCOMA.

Many examples of the common form of epulis contain spindle-shaped and round cells, as well as fully formed fibrous tissue. They resemble the fibrous epulides in their situation and general characters, but differ from them in their microscopic structure (as already stated) and in the facts that they are somewhat softer, grow rather more quickly and have more tendency to recur after removal. They often contain spicules of bone.

MYELOID SARCOMA,

A myeloid epulis consists of a stroma of fibrous or fibro-cellular tissues embedded in which are a number of multinucleated giant cells. They are identical in structure with the myeloid sarcomata which grow from the interior of the ends of long bones. Although they project upon the gum they grow from the bony alveolus and not from its periosteal

covering like the fibrous and fibro-sarcomatous epulides. They are much rarer than the ordinary epulis and are more vascular and therefore softer; they are of a dark maroon tint, and are often mottled with purplish spots; they occur in young subjects and grow rather quickly, and show a decided tendency to recur unless they are very freely removed.

VASCULAR TUMOURS.

This name is given to a variety of epulis which is composed of fibrous tissue containing a large number of dilated thin-walled blood vessels mostly venous in nature. These tumours are most often met with in the incisor region, and may grow from the gum, from the periodontal membrane, or from the alveolus itself. In some cases they appear to be in connection with decayed teeth, whilst in others they have no connection at all with the teeth. They usually begin as a small bright red spot which grows slowly, forming either a sessile tumour which passes between the teeth, or a little pedunculated growth which hangs from the gum; they are very soft and compressible, of a bright red or dark purplish colour according to the nature of their vessels, very prone to bleed when damaged by a tooth brush or hard pieces of food, more especially when the surface is ulcerated, and occasionally they pulsate synchronously with the action of the heart. They are innocent tumours and do not recur after removal.

PAPILLOMA.

Papillomata of the gum are rare. It is not customary to apply the term epulis to this variety of tumour. They consist of an overgrowth of the papillæ of the gum and resemble papillomata of other parts of the body in their microscopic structure, being composed almost entirely of epithelial cells supported by a fine fibrous substructure. They may grow from any part of the mucous membrane covering the jaws.

They are usually pedunculated; their surface may be more or less smooth, or may resemble a small piece of cauliflower, or may be surmounted by long shreddy processes like enormous filiform papillæ.

They are innocent tumours, but occasionally in old people they may become epitheliomatous, especially when exposed to continual irritation.

EPITHELIOMA.

Epithelioma of the gum occurs as an ulcer more often than as a definite tumour, it is therefore undesirable to include it under the "epulides." In structure the growth resembles squamous epitheliomata of other parts.

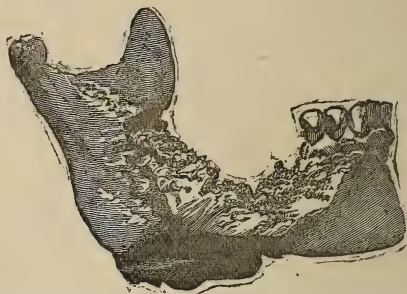


Fig. 35.—Epithelioma of the Gum causing extensive destruction of the Jaw.

(*Museum of the Royal Free Hospital.*)

The onset of the disease is very insidious and apt to escape recognition; it begins as a small ragged ulcer usually close by a diseased tooth which has been a long-continued source of irritation to the gum. After removal of the offending tooth the ulcer does not heal as it would were it of a simple nature but tends to increase both towards the cheek and towards the tongue. Induration of the base of the ulcer soon occurs, but owing to the natural hardness of the gum it cannot be appreciated until the ulceration has extended to the soft tissues of the cheek or tongue. As the ulcer increases in size its edges

become ragged and everted and its surface foul and sloughy. Before long the lymphatic glands at the angle of the jaw become enlarged, hard and fixed. The breath is foetid, mastication very painful and there is profuse salivation; ultimately cachexia supervenes and the patient dies from exhaustion.

Diagnosis and Treatment of Tumours of the Gum.

It will not suffice to make a diagnosis of "epulis"; that there is a tumour on the gum will be at once evident on inspection. The important point to decide is the nature of the tumour, as upon this decision the prognosis and treatment must depend.

It is not always easy to distinguish between a purely fibrous epulis and one in which there is an admixture of sarcomatous elements until a section of the tumour has been made and examined under the microscope. One must be guided by the rate of growth and the consistency of the tumour; the longer it has been growing and the harder it is to the touch, the more likely is it to be purely fibrous and, conversely, the more rapid its growth, and the softer its consistence the more likely is it to prove sarcomatous.

A simple fibrous epulis should be cut away with the smallest amount of damage to the surrounding parts. It will usually suffice to remove it with a knife or a small gouge. The adjacent teeth unless obviously decayed and in close connection with the growth should not be interfered with; it often happens that a permanent cure can be effected without the sacrifice of a tooth.

If from the rapidity of growth and soft consistency of the tumour it is suspected to contain sarcomatous elements, or if recurrence has taken place after previous removal, then more radical means must be adopted. Not only must the whole tumour be removed, but a thin layer of bone must also be taken away from the site from which the tumour springs. If the growth originates from or involves the alveolo-dental

membrane the tooth must be extracted, and the alveolus cleared out with a gouge. When the growth is large and sarcomatous in nature it may be necessary to remove the whole thickness of the alveolus ; this may be accomplished by making a vertical saw cut on each side of the growth, and detaching the piece of bone carrying the growth by means of cross-cutting bone forceps. In those rare cases in which the size of the tumour necessitates an external incision it should be made in the middle line of the lip, the resulting scar being scarcely perceptible. The lower border of the jaw should always be saved if possible so as to preserve the contour of the face.

Vascular tumours of the gum are easily recognized by their colour and by their great tendency to bleed. They may sometimes be cured by repeated applications of powdered tannin, but the most satisfactory treatment is to excise them and to arrest the subsequent hæmorrhage by applying the actual cautery.

Papillomata should be excised.

The early diagnosis of epithelioma of the gum is a matter of great importance, for it is only whilst the disease is still small that there is any hope of effecting a permanent cure. Any chronic ulcer on the gum in a person beyond middle life, should be regarded as malignant if it fails to heal after the removal of all sources of irritation such as rough teeth or badly fitting plates. In doubtful cases the diagnosis may be settled by removing a small piece of the edge of the ulcer and examining it microscopically. The treatment must be effective and must be carried out without delay if the patient's life is to be saved. No time must be wasted in applying caustics, but the growth must be very freely excised, removing at the same time a wide area of healthy tissue. It will always be necessary to remove the whole *thickness* of the

jaw, and very often the whole *depth* as well. Before proceeding to operate the surgeon should make up his mind that he has a fair chance of removing the whole disease, an incomplete operation is worse than useless.

(*To be continued*).

COAGULANTS.

By Dr. M. L. RHEIN.

It would seem as though the agitation of this subject, as we have listened to it for the past few years, should bring some great material benefit to us in our practical work in this direction, and I believe it will in the future. Up to the present time I do not think we have acquired, as a whole, any practical gain from this subject, but it is bound in the end to bring about a clearer understanding of our methods of procedure in the roots of teeth as soon as we are sure we have reached the truth of this matter. It is the one place in which a dentist works in the dark; that is to say, when he is inside of the canal of a root he has got beyond the point where everything is absolutely open to his eye. To this fact are due many of the errors and mistakes in treating root canals. To my mind the agitation that has been started between Dr. Harlan and Dr. Kirk would not amount to much if we could get them both together. The unfortunate thing is that they always appear separately, and the other man is always absent. I have had the pleasure of discussing this question with each of these men at some considerable length, and, astounding as it may seem, can see very little difference in their views.

British Journal of Dental Science.

LONDON, DECEMBER 2, 1895.

A BLACK SPOT WHITENED.

Our readers will find elsewhere Sir Dyce Duckworth's reference to "black spots" in our Profession. We now deal with one recently under treatment. Since our last issue the final stage in the prosecution of the "Strand barbers" has been completed, and we may now without fear of injustice refer to the matter. The details of the evidence are probably well-known to our readers and we need not travel over them. The main facts are very simple and illustrate the manner in which quackery can be carried on without resorting to the usual method by means of advertisement. A customer who merely desired shaving had a little lecture given to him upon the teeth, and if he was a ready listener it frequently resulted in permission being granted to the barber to clean and "whiten" the customer's teeth with hydrochloric acid. Sometimes more extensive operations were indulged in, and a dentist's show case, exhibited in the shop, lent some weight to the representations that a barber might also be a dentist. There was nothing very new in this, for at other barbers' shops in London and elsewhere, the same claim has been made. The peculiar point is that if the operators had been content to make an ordinary charge in keeping with their legitimate occupation, we should probably have heard nothing of their pretensions. They were not charged with wrongfully describing themselves as dentists which would merely have resulted in a fine by the magistrate, but a more specified and serious charge led to them being placed before a jury with the result that one is in prison for fifteen, and the

other for twelve months with hard labour. The question occurs to one's mind whether such a charge may not one day be brought against certain unregistered men practising as dentists, more openly than the barbers did, and who, whilst not taking the trouble to find their patients are from a distance, and to be blackmailed, yet practically do obtain the money under false pretences.

We are accustomed to be told that the public are ready, if not willing, to be deceived, but at least one of the witnesses, if we remember rightly, seemed to think that such assurances as were offered by the barber must be legitimate or they would not be permitted. Ignorance on the part of the Public is the only real explanation which can be given, and we do not for one moment agree with *The Daily Telegraph* that "undoubtedly it must have been an impulse of personal vanity which lured the victims of these irregular practitioners to the depletion of their purses and the possible destruction of their molars." The Public, as well as *The Daily Telegraph*, have first to learn the importance of tooth-culture from a functional as well as from an æsthetic point of view, and next that the Legislature has endeavoured to protect the public as far as Public Opinion will allow it to. Our sympathies are with the victims inasmuch as they did not shirk a public duty in becoming witnesses, and thereby probably helping forward that education of their fellow citizens which alone is needed to secure additional protection in the future.

We must not, however, be supposed to take too hopeful a view about a public awakening. It is just two years since, in the case of the "Indian oculists," a jury regretted that there was no criminal law to prevent ignorant persons from practising surgery. As we then pointed out, the education of the British Public, even by experience, was tedious, and nothing has occurred in the meantime to make one think the situation is much improved. The "Unregistered Dental Practitioners' Association" claim to know something about a new Medical and Dental Act, and if they have reasons for their belief we must not expect too much from

new legislation. The oculists from the East escaped because it was not proved, to the satisfaction of the jury, that the prisoners were themselves aware that their pretences were false; the barbers did not similarly escape, and we must be content with that. We do not wish to gloat over their punishment, but it must be remembered that, as we have before recorded, applications by prisoners for a tooth-brush have been met by the answer, "The State does not supply them." Let us, then, not try to imagine the feelings of men so keen upon the cleanliness of the teeth, when finding themselves deprived for a lengthened period of the necessary tooth-brush and, presumably, also of a small supply of "spirits of salts" for "whitening."

THE TREATMENT OF SNAKE BITE.—We noticed a short time ago Professor Fraser's inoculation experiments with immunised serum for the cure of snake-bite. Another new departure is now reported to the *Académie des Sciences* by MM. Physalix and Bertrand. So far as the viper is concerned, their experiments go to show that its blood constitutes a real antidote to its virus. In guinea-pigs they were able to counteract the effects of a fatal dose of a viper's poison by injecting a small quantity of the latter's blood.

THE ROYAL SOCIETY.—At the anniversary meeting (November 30th), the Davy medal will be presented to Professor William Ramsay, of University College, in recognition of his work in connection with the discovery of argon and helium. Dr. John Murray will receive a Royal medal for his services on the reports of the Challenger expedition, and Professor J. A. Ewing one for investigations into magnetic induction in iron and other metals. The Copley medal goes to Professor Karl Weierstrass for mathematical researches. Sir Joseph Lister, Bart., the President-elect of

the British Association, succeeds Lord Kelvin as President of the Royal Society, and Mr. William Crookes becomes a member of the Council.

CHRONIC NASAL OBSTRUCTION.—Mr. Mayo Collier in a recent address said that nine out of ten civilised persons have some irregularity or abnormality of the nose, and that four out of five savages, aborigines, or uncivilized beings have normal nasal cavities. The speaker is of opinion that such deformities are brought about by atmospheric pressure in association with partial obstruction, and he disagrees with Trendelenberg, who has pointed out the frequent association of highly arched palates and crowded irregular teeth with nasal obstruction and believes that the palate pushes up and deforms the septum. Mr. Collier asks what pushes up the palate, and insists that the same incontestable force (atmospheric pressure) that pushes in the septum must, of necessity, push in the hard and soft palate, and there is no help for it. It would be contrary to the laws of nature if it were not so. Will not this theory account for the saddle-shaped arch in mouth-breathers?

SUGAR AND THE TEETH.—Dr. Vaughan Harley read a paper at the British Medical Association, in the Physiology Section, upon "Sugar as a food." In addition to praising its virtues, the author combats some of the vices ascribed to sugar. He says that the popular view as to sugar ruining the teeth is not borne out by observation, and that people accustomed to take large quantities are not more liable to bad teeth, but, on the contrary, have in many cases exceptionally fine ones. He quotes the case of the negroes of the West Indies, who are in the habit of taking large quantities of sugar.

Abstracts of British & Foreign Journals.

GENERATION AND DEGENERATION OF THE TISSUES OF THE MOUTH.

By W. H. WHITSLAR, M.D., D.D.S.

In the formation of enamel or dentine, calcific material is held in chemical combination with the intercellular substance in the vicinity of, and in the enamel organ and dentinal papilla. By the action of ameloblasts and odontoblasts—specialized cells—enamel and dentine are formed. It is by their activities that the lime is deposited chemically as well as physically. An aggregation of cells composes what is termed the enamel organ, and it is said that the function of the enamel organ is the formation of enamel. Strictly speaking, however, it is a matrix to mould the form of the tooth, the performance of function being resident in the ameloblasts. Function is a vital phenomenon; and pathological conditions are perverted physiological phenomena. The difference between these two conditions is an indefinite line wherein the balance of vitality is overcome by perverted function. If tissues are degenerated from their normal tendencies, regeneration balances the waste, but if they are normal it is a physiological process. If, however, the cell destruction is greater than the cell production, regeneration is suspended and atrophy results. Thus we observe that the degree of atrophy is proportionate to the diminution of function. Now we frequently find that teeth have white and brown spots that are congenital. These spots are the result of perverted function of the cells that superintend the deposition of the lime salts. This perversion is ostensibly caused by starvation or improper metabolism of foods. It would not be entirely amiss to surmise that the white spots were produced by increased function, but limited in the supply of organic materials. In these we find the intermediary organic substance is deficient. The coloured spots contain a greater amount of organic matter than the white spots. This may be due to the sluggishness of circulating fluids in the vicinage, resulting in stagnation or lessening of the chemical and physical processes. Thus, while other parts of the tooth are developing, an area of imperfect tooth material is constructed, which is due to the

lack of power of the cells which have to do with the building, so to speak. There is a failure of correllation of the organic and inorganic substances, and the tooth becomes more of an admixture than a proper organization.

Notwithstanding criticisms to the contrary, I believe that hæmoglobin and oxyhæmoglobin of the blood and their derivatives, hæmochromogen, hæmatin and methæmoglobin, acting as transudation products, or even the results of decompositions, stain these areas by being incorporated with the material. It is to be remembered that the blood vessels are in close proximity to the ameloblasts, also that these cells are derived from the Malpighian layer of cells, which have to do with the pigmentation of the mucous membrane. There is in this a close analogy which may be significant. However, we must rely upon the activities of the blood in the vicinity, for it is the first tissue to exhibit extreme atropic changes. It is necessary to have blood present after the first stages of calcification to further that process. During these preliminary stages the mineral elements may be found in proximity to the developing tooth, and from these the primary deposits may be accrued. The mineral substances are the most essential constituents of the teeth. Phosphate of lime is greater in amount in the teeth than in any other tissue. The consumption of it during pregnancy is often so great that it does not appear in the usual amounts in the excreta, scarcely any trace being found (Lehman). This may account in part for Lehman's declaration that lime salts are deposited mechanically in bones. He gives as proof the ease with which lime salts can be so thoroughly dissolved from bones by hydrochloric acid. The question naturally arises, are mineral substances manufactured within the body? It is established that on the burning of the organic substances the mineral bodies are liberated and eliminated. They, in part, combine with new products of the oxidation and become attached to the organic bodies which are free from salts, and are absorbed from the intestinal canal. Hence it would be seen that a constant supply of mineral substances is not absolutely necessary, and that an insignificant amount of inorganic bodies must be administered. So I wish to agree that, for this scientific reason alone, it is not a necessity to administer constantly foods bearing large quantities of phosphatic materials to develop good teeth. We must rely upon the resiliency of life as the energizing power to create metabolism. Physical forces strive to maintain themselves in equi-

librium—thus we have metabolic power. A point of rest, normal state of being, is obtained because physical forces act upon matter even if it has attained its equilibrium. Inorganic chemistry also induces motion, and continues active in motion and metamorphoses until the closest affinities are satisfied. Albinus established the axiom that the essence of vital force consisted in motion. But if that vital power is by disease deficient, then the metabolism of materials into tooth structure is obstructed, and we see the results in deformed teeth, both as to form and structure. For example, let us suppose that fever disturbs the parturient woman, she is robbed of nutritive power to supply her embryo. Unfortunately nature does not come to the rescue, and, the equilibrium being unbalanced, she is sacrificed at the expense of her general health, and the embryo develops, but less actively. Because of this sacrifice, we seldom witness defective deciduous teeth and unless the parent recuperates, the disease shows its tracings upon the permanent teeth.

Rachitis and concomitant diseases, affecting particularly the bony structures, are resultant from imperfect metabolism and starvation. The mineral substances leave the body uninterruptedly, in starvation, until death (Hammarsten). The experiments of Chossat and Noit show the loss of weight of bones during starvation to be as high as 17 per cent. in pigeons and 24 per cent. in cats. Blood and its solid ingredients decrease in proportion to the weight of the body. Naturally, then, the teeth, whose development is dependent upon blood, must suffer. It is not necessarily sufficient to argue that the teeth suffer in the same proportion as bones, because one system of organs may derive its nutriment at the expense of another organ, so it is impossible to say the teeth receive their aid from this or that. They do suffer, however, and all the permanent teeth developing whilst in utero show at times marked signs of starvation. The cells, which are the constructive agents of the teeth, may have such environments that the resiliency of their activity is sufficient to controvert the disease; their chemical and physical activities are alert, and extract from other tissues material for a continuance of construction. This seems to be a gift of specialized cells. Phosphate of lime is an important adjunct in metamorphosis of animal tissues, and we receive much of it through our food. The graminivorous animal receives it through the vegetable kingdom, in certain nitrogenous bodies which contain phosphate of lime, as in vegetable albumin, leguin and

glutin. Phosphate of lime is not removed from the body until it is partially decomposed or oxidized, and in this process phosphoric acid must accrue, entering into union with the lime that enters the body with cereals and leguminous plants.

The Dental Digest.

VARNISHING CAVITIES.

By W. G. BROWNE, Atlanta, Ga.

The writer says that owing to the incompatibility of tooth-substance and the materials used for filling teeth, it is best to interpose some substance between the material and the dentine, and he recommends a clear resin, such as damson, dissolved in chloroform. It acts as a non-conductor of thermal changes, as well as an insulator against electrical influences. It is not readily soluble in the fluids of the mouth. Being transparent, no discolouration is shown when used where enamel walls are thin; in fact, it prevents discoloration of the tooth from oxidization when an oxidizable amalgam is used. It is helpful in starting large gold fillings holding the first cylinders firmly to the dentine, and lessening the danger of the fillings coming out. While it does not by any means supply all the anchorage needed, the varnish does away with the deep retaining pits.

The Dental Digest.

Reports of Societies.

MANCHESTER ODONTOLOGICAL SOCIETY.

The first meeting of the Session, 1895—6 of the above Society was held on Tuesday evening, the 1st Oct., at the Grand Hotel, Aytoun Street. Mr. W. Simms, president, in the chair. There was a large attendance of members.

NOMINATION OF NEW MEMBERS.

The following gentlemen were proposed for membership—
Mr. J. P. Headridge, L.D.S. Eng. B.Sc., Manchester, and
Mr. J. A. Lees, L.D.S. Eng., Buxton.

CASUAL COMMUNICATIONS.

Mr. D. HEADRIDGE said he wished to say a few words in regard to what was known as the Downie furnace. No doubt many of those present had seen it in actual work at the B.D.A. meeting in Edinburgh. It was very neat and compact, and seemed especially fitted to do crown work. Two great points in its favour were the little amount of gas it used, and the rapidity with which the body was fused, the latter only taking two or three minutes. The makers of the furnace has also produced a low fusing tooth body, samples of which, as well as the furnace, he had pleasure in shewing.

Mr. WHITTAKER exhibited a model showing an interesting case of irregularity. The right lateral and central were transposed. The left lateral was very much inside the mouth (and had since been extracted), and formed a triangle between the canine and the left central. The patient was thirty years old. Mr. Whittaker also gave the particulars of a case where a canine, the patient said, had been taken out by a dentist thirty years ago by mistake, and immediately replanted. The apex of the tooth did not seem at all absorbed, and the tooth was not decayed. The tooth never troubled him till the last two or three months, when the gum around it became inflamed.

Mr. D. HEADRIDGE said he, too, had had a somewhat similar case to deal with. The patient told him that some ten years ago he was having a molar extracted, when the second bicuspid jumped out of its socket. It was at once replaced and remained fairly comfortable until about a year ago. Slight inflammation then set in, but yielded to treatment. A week ago the inflammation recommenced, and as it seemed no use attempting any further treatment the tooth was taken out. He then found that although the apex of the tooth was healthy, the side of the tooth was absorbed.

Mr. COLLETT said the subject was very interesting, and one would like to know whether in the case of replanted teeth, the severed nerve became reunited, because in all such cases that he had seen the teeth had been dead.

The PRESIDENT said it has been claimed that the severed

nerve sometimes became re-united, but he had never seen a case in which inferentially, he judged that such a result had been secured. It was, however, reliably stated that it had occurred in some cases. But he himself believed that the chance of its doing so was so remote, that in all cases of replantation, it was far the best thing to extract the pulp and fill the canal before replacing the tooth.

Mr. WHITTAKER mentioned that he had replanted three teeth, from one of which he extracted the nerve and filled the pulp canal with hickory wood, and they were all going on satisfactorily.

Mr. BIRKETT said he had one of his own teeth replanted, but it was never comfortable, and he had it taken out eighteen months later. The failure was perhaps due to want of care in the treatment of the tooth when it was taken out.

The PRESIDENTIAL ADDRESS.

Prof. LUND in rising to propose a vote of thanks to the President for his address, said everyone present must feel deeply grateful to Mr. Simms for having given them such an excellent paper. It was written throughout in the right spirit, and evidently was the result of much thought. There was not only an important present condition in the dental profession, but there would be an even more important state of things in the future. The people of this country generally were taking an increasing interest in the varied means of securing good health, and not the least of those means was the work done by the dental profession. Their methods were improving year by year, and they might be sure that the public would be constantly making ever-increasing demands on their resources. Referring to the eulogy passed by Mr. Simms on the late Sir John Tomes, Prof. Lund said he knew him well in London when he (Prof. Lund) was a student, and later through his connection with the Royal College of Surgeons, and his presence had a most stimulating effect upon all with whom he came in contact. He often took part in the discussions, and always displayed a thorough grasp of the subject he was talking about, more especially that of the comparative anatomy of the teeth. Sir John Tomes' death was a great loss, but he had left them as a legacy the tremendous amount of work he accomplished in his lifetime, as an example and incentive to others. The paper also let in a little light on that much discussed question in both the medical and dental professions, namely, the pupillage system.

There were two views on the subject. Some men held it was better to take a youth, well-educated, direct from school, and put him at once to his classes and teach him his anatomy right off, and all that sort of thing, but he (Prof. Lund), thought that a slight introductory training in physiology, and so on, would be for the benefit of the pupil, and a youth who had that preliminary knowledge would be more likely to have a keener desire to learn and master the details of his profession than one who had not.

Mr. W. HEADRIDGE said it was with great pleasure that he rose to second the vote of thanks to the President for his address. He also deeply deplored the loss of their late leader Sir John Tomes, and should always remember with pleasure the kind way in which the latter lent him a helping hand when he met him in London more than thirty years ago.

Mr. DOUGAN supported the vote of thanks. He said he believed that the scheme of education as propounded by Mr. Simms would eventually be adopted.

The PRESIDENT in reply said the remarks of Professor Lund with reference to Sir John Tomes were especially welcome, coming as they did from one who had known him personally, and who was so able to estimate the value of his scientific work.

VOTE OF CONDOLENCE TO THE FAMILY OF THE LATE SIR JOHN TOMES.

On the motion of the President a vote of condolence was passed to the members of the family of the late Sir John Tomes, which the secretaries were duly instructed to communicate.

DISPLAY OF DENTAL INSTRUMENTS AND APPLIANCES.

Messrs. C. Ash and Sons provided a large display of Dental Appliances and Novelties, including a Dental Wall Cabinet of new design, and Mr. Booth Pearsall's new appliance for casting metal, and the cordial thanks of the Society was accorded them for their excellent exhibit.

ALUMINIUM FOIL.—In vulcaniztng, use aluminium foil to have your plates come out with a bright and finished surface. It does not darken the rubber.—*Zahutechnische Reform.*

THE EDINBURGH DENTAL STUDENTS' SOCIETY.

The first ordinary meeting of the present session of this Society was held on the evening of November the 11th, when Mr. E. Oswald Fergus, L.D.S., of Glasgow, read a communication regarding the treatment of root canals, by a method introduced by Dr. Callahan, of Cincinnati, O. The treatment consisted of cleansing the canals with a forty per cent. solution of H_2SO_4 , which being immediately followed by a saturated solution of bicarbonate of soda, produced a strong effervescence. Printed sheets were placed before the members on which were tabulated seventy-five cases out of one hundred and thirty root cases already treated by Dr. Fergus since January. A demonstration followed, and many interesting points were elicited from the Dean, and the demonstrator, during the discussion. Mr. J. Malcolm, L.D.S., the President, presided over an attendance of thirty-four, and thirteen new students were nominated for membership.

On the previous Friday evening, the 8th, a Smoking Concert was held in the Imperial Hotel, the chair being occupied by Mr. Fred Page, L.D.S., and there were over 150 present. A capital programme was provided by the students, who proved themselves in their individual, and concerted efforts, most capable performers. Altogether a most enjoyable evening was spent, and the concert was generally granted to be as good, if not better, than any of its predecessors.

The Sixth Annual Dance will be held on Friday, December 6th, in Aitchison's Assembly Rooms, and everything already points to its being as successful as in former years.

NERVE PASTE. Dr. Diack considers morphia in a nerve paste ineffective, likewise tannin, aristol, iodoform, cocain or oil of cloves. He adds belladonna ext. to the arsenious acid, two parts of the former to one of the latter, and mixes them into a paste with glycerine. Belladonna acts on the sensitive nerves, and no pain follows the application of the paste.

Dental News.

THE NATIONAL DENTAL HOSPITAL AND COLLEGE.

The Annual Dinner of the Past and Present Students was held in the Venetian Saloon at Holborn Restaurant on the 22nd ult. The chair was taken by Sir Dyce Duckworth, M.D. who was supported by Sir James Crichton-Browne, Mr. Christopher Heath, F.R.C.S., Messrs. C. S. Tomes, F.R.S., J. Smith Tunner, Morton Smale, S. J. Hutchinson, F. Canton, J. H. Mummery, Ashley Barrett, Dr. Coupland, Dr. Thos. Barlow, Dr. Ormerod, Mr. Langton and Professors F. T. Roberts, H. R. Spencer and J. R. Bradford, F.R.S.

Grace having been sung and the loyal toast duly honoured, the Chairman called upon the Dean, Mr. Sidney Spokes, who said he did not intend to submit a lengthy report. The number of the Students on the books during the year had been over forty; they had sent twelve candidates up to the Royal College of Surgeons of whom nine obtained the diploma. Two others had preferred to go farther north where they were now in practice, one taking the Edinburgh, and the other the Glasgow diploma. The changes on the Staff had been few. Mr. F. A. Canton, after twenty years' service had felt obliged to resign his post as Surgeon, to which office Mr. T. G. Read had been appointed. Dr. J. W. Pare had been elected Lecturer on Dental Anatomy, and both he and Mr. W. H. Wheatley were chosen Assistant Dental Surgeons.

The Chairman then presented the Medals and Certificates of which the following is a list:—

Dental Anatomy—

Medal: S. F. Rose; *Certificates*: T. E. Sugden, W. Sunderland, H. J. Relph.

Dental Surgery—

Medal: H. W. Moore; *Certificates*: E. A. Wheeler, A. E. Relph.

Dental Mechanics—

Medal: W. E. Hill; *Certificates*: H. W. Moore, W. Jones.

Dental Metallurgy—

Medal: H. W. Moore; *Certificate*: H. J. Relph.

Dental Materia Medica—

Medal: C. Fox; *Certificates*: E. A. Wheeler, W. Jones

Histology—

Certificate : R. Halliday.

Operative Dental Surgery—

Medals : H. J. Relph, H. W. Moore.

Entrance Exhibition, value £15 ... H. V. Tattersall.

Students' Society Prize ... W. Jones.

The Chairman then said :

Gentlemen, After the short and interesting ceremony we have just witnessed, it is very fitting that I should propose for your acceptance the Toast of the evening, the Toast of the National Dental Hospital and College. I most heartily give you this toast. A few days ago I had the pleasure and satisfaction of going over that hospital under the kindly care of your courteous Dean, and I was interested to go through the different rooms and apartments in that hospital, I am afraid to confess it was a revelation to me, and I came away thoroughly satisfied of the excellence of its teaching arrangements, feeling that any young man who went there had a most excellent instalment, the largest and fullest arrangements and a most perfect equipment for the prosecution of his studies I am sure we have heard enough about the examinations passed from this hospital to make us feel certain that good work is done there, which bears fruit in successfully passing Examinations and which may bear greater and more useful fruit in providing excellent surgeons for practising among the public.

When I look back some twenty-five years, I cannot but see the great difference which has come over that profession, which you all of you practise, or are preparing to practice. An extraordinary advance has been made in the profession and the attainments of the modern dentist. I can recollect when things were far different. I suppose it is not too much to say that the greater part of these results have accrued since the institution and coming into force of the Dentists' Act of 1878. No one can doubt the supreme benefits which have accrued to you from that Act. As you now stand, things really present a fair field for all of you, but there are some ugly spots when one surveys the horizon. I confess I see some ugly spots, and I have no doubt they are seen as fully by you. To mention one; I cannot doubt that the practice of advertising on the part of some members of your body, or people who have described themselves as belonging to your body, is much more rife than it was twenty-five years ago. I suppose it must be connected with the modern fashion of advertising which has come across the Atlantic to us, and which we have perhaps too freely adopted. One of the ugliest spots I can see is caused by those of your brethren who advertise in an unfair, and undue, and extravagant form. I am sure that this must be a source of great annoyance and sorrow to many of you, and it is a matter which must come before our consideration in the General Medical Council. It is a very difficult matter for us to take hold of as a body, but we sympathise sincerely with you in the consequences you must suffer. I think it must be accounted for by the fact that a large number have been admitted into the ranks of dentist who are not fitted for the position, and not fit to hold the position among gentlemen educated and brought up

as you are. These people being little better than artisans, are not gentlemen, and we are therefore not surprised at the course they pursue. With regard to the question as to the powers of the Medical Council, I am sorry to say the powers granted us by Parliament are sadly limited. As a judicial body, we cannot go into the streets and bring in, to judge, people who are guilty of conduct, which I consider most infamous. They must be brought before us. All you have to do is to bring them up with sufficient evidence to prove that their conduct is unworthy of the profession to which they belong. If you do that I have little doubt we can mete out such justice as they deserve, but in the meantime we cannot go out and bring them in ourselves as a body. I consider that the teaching of the hospital is excellent, and the diplomas you give cannot fail to inspire confidence. My own rule whenever I come across young Dental Students, is to advise them to enter for the whole profession if possible, but still I know full well that many are satisfied with the diploma you receive which gives the title of L.D.S., the examinations for which should supply full confidence to the public. The knowledge of the present dentist would have been astonishing many years ago, and if it advances in the next half century as it has done in the past, you will have raised it enormously in public estimation. The public will gradually learn, credulous and gullible as it may be, the difference between properly qualified men, and the imposter who exhibits a case of things outside his house, but who is not the man he represents himself to be; but long before the public are incredulous, you will have raised yourselves to the highest position it is possible to obtain. It is sad enough to see, and more pitiable to contemplate, how a newspaper, which I have not read, but which I have been told about, espouses the cause of unregistered dentists who do cheap work, commending these debased persons as being of quite equal ability with yourselves, and it is said that these unregistered persons contemplate forming themselves into a kind of corporation, and attempting to show some sort of fight, and to flaunt their position in the face of the public; but if they do this perhaps some of us in power will be able to prick their bubble. Let me recommend you to begin from now to aim at high things. I have lived long enough in the world, although I am not an old man, I have lived long enough in the world to see that the men who from an early date of life aim at high things, generally succeed in getting their fortune to the highest pinnacle, or very near it. The struggle is hard and the effort is great; while you are waiting you must be busy, you must be bright, you must be cheerful, and you will never succeed if you have not as good a stomach as a head. If you have not a good stomach, a good temper, and a good heart, the sooner you set about acquiring these the better it will be for you. I think you will find I have said quite enough in regard to Dentistry, and I now ask you to drink this toast, of your own College, its greater success in the future than in the past, and of this I feel quite assured, judging from the physiognomy of those present, who trained in the traditions of the best and highest men of their profession will obtain the right to deal with the tenderest pain in human nature. Gentlemen, the toast of "the National Dental Hospital and College."

The Dean said :—

Sir Dyce Duckworth and Gentlemen,—In responding on behalf of my colleagues I beg to tender you our most sincere and hearty thanks for the sympathetic words you have spoken. I do not propose to trespass on your time in such a way as to allude to all the various points you have so eloquently dealt with. There are perhaps one or two points distinctly alluding to the way in which we should direct our course. With reference to these ugly spots that you refer to and to the “unfair and unduly extravagant forms of advertisement;” Of course, sir, we all know, there are various modes of advertising, and I have yet to meet with that philosopher, if he ever succeeded, who could distinctly draw the line as to what was advertising, and what might not be considered as advertising. But we are one with you, sir, in your regret at the consequences which arise from this extravagant and undue form of advertising. The position of the General Medical Council to which you were pleased to refer is one of extreme interest to the dental profession and the young members of this profession, and although you describe yourselves as a judicial body I think you may be regarded also as an authoritative body, and I would therefore suggest that although I believe this extravagant form of advertising does enable the quack to defraud the public, who, by the way, we are told wishes to be deceived, yet there are other methods in which you may help on the good work, than merely by the suppression of advertising. A committee has been sitting, upon the amendment of “The Companies’ Act.” Now, sir, there are quacks who do not find it necessary to resort to advertising; the two gentlemen, who are now languishing for 15 and 12 months respectively, did not find it necessary to resort to any advertising, they looked into their customers’ hats. And if they had formed themselves into a Limited Liability Company, it is possible they might have been able to offer an extremely good defence at Bow Street. Individual men are prevented by law from doing certain things, while if two or three take advantage of the Companies’ Act they can do things that otherwise are illegal. It is in regard to a possible amending of the Companies’ Act that I suggest the General Medical Council may do some good by allowing the opinions of such an Authoritative Body to be made known in the proper direction. You were good enough to refer to the close connection between Medicine and Dental Surgery, and I may therefore say that out of the six gentlemen whom we last sent in for the College diploma five were “conjoint” men who had already passed the second examination. I think I have trespassed long enough on your time in responding to this toast of the National Dental Hospital. We reciprocate all the sentiments, we sympathise with all the remarks you have made with regard to dental advertising. There are several very important matters I might refer to, but I feel that on an occasion like this, when we are anticipating the pleasures of music I ought to set a good example and at once sit down.

Sir JAMES CRICHTON BROWNE next proposed the Toast of
“The past and present Students.”

Mr. Chairman and Gentlemen,—To an imaginative mind there is always something moving in looking upon a band of recruits, young men ready to enter upon the battle of life, gradually press-

ing forward, full of high hope and courage: and there is also something moving in looking upon a band of veterans, older men, who have already taken some part in the conflict of life, and who scarred and victorious, come back to visit the scenes in which they were prepared for that fight. That being so, we are all here this evening, and we all being copiously gifted with imagination, have a doubly moving appeal made to us, for we have here both the recruits and the veterans, the past and the present students of this National Dental Hospital, whom I have to present to you as a Toast. We have here the Past grasping the hand of the Present in a friendly grip, and both looking into the future with confidence; for whatever moving sentiments a scene like this may call up, I am quite sure that there is one feeling that is predominant at this table this evening, and that is a feeling of cheerfulness for the success which attends this hospital, in which past and present Students are alike interested, a feeling of thankfulness for its prosperity and its steady growth in public usefulness. The past students, I am sure, assemble upon an occasion like the present full of gratitude to the hospital which in those less palmy days, when it had less splendid buildings, yet still conferred great benefits upon them, and prepared them faithfully and well for their professional career, and I feel sure they would say to anyone who would assail it—

“Touch not a single bough,
In youth it sheltered me, and I'll protect it now.”

As to the present students of the hospital I am sure they come here this evening full of just pride in a hospital which they know to be a model of its kind; they come here determined that they will by their personal exertions in the future retain that high reputation. To the past and to the present students, I offer my hearty congratulations on their connection with this hospital, and to their connection with a profession which I believe is destined to advance in public estimation. Dentistry is still in its infancy, emancipating itself from some of those “black spots” which have been referred to, freeing itself from some disagreeable elements and perfecting itself more and more in public estimation. It will rank more and more as a profession, and it will rank more and more with that profession of which I myself and many of those present are members. It is a lamentable fact that the need for dental care is spreading enormously. The teeth of the young decay in a way which was unknown in former generations. That I take to be an indisputable fact, and that being so it is clear there will be an ever increasing demand for dental assistance in the future. The decay of teeth that is going on almost impresses upon us the belief that dental decay is one of the failures of civilization. Up to one point in man's history, he held his own, in the struggle for existence, by the same customs that he enjoyed in common with the Tiger and the Ape, but as his moral development has gone on, he has laid aside his animal propensities, and has resorted to weapons otherwise than those provided by Nature, and as his ethical development has gone on his teeth have deteriorated. At one time every British mouth contained, to use the words of Svengali in *Trilby*, “32 sound British teeth white as milk, and big as knuckle-bones,” but now, alas, it contains only a beggarly array of British stumps, brown as

coffee and brittle as glass. It seems to me that the state of the teeth is a question of national interest. If it is the paramount duty of England to see to her iron-clads, it is no less her duty to see to her enamel-clads, those first lines of defence to the Alimentary Canal, which secure us against the invasion of disease and against constitutional debility in various forms. It seems to me that this spread of dental decay and the increasing recognition of the value of sound teeth, so conducive to comfort and to health, must lead to an enormously increased demand for dental assistance and you must be prepared to meet this demand not only from the upper classes, but also from the masses. Slightly altering the words of the proverb, it might justly be said "Go to Japan, thou sluggard, consider her ways and be wise." I read in the *Times* recently a description of that exhibition now being held, and it was stated there that they have in Japan dental apparatus that is equal to anything that is seen in Europe or America, and I read with great interest that in the streets of Japan, even among the lowliest members of the population, there may be seen in their mouths the golden traces of the dentists art. If I am not keeping you I should like to say that it seems to me the public might be encouraged to seek dental assistance if there was a definite scale of dental charges. It has always appeared to me that a man who seeks dental or medical assistance, ought to know fairly, what costs he would incur, and if that were so, many people who are now diffident about coming to seek dental assistance, would be induced to come forward. Of course it involves special skill and therefore you are entitled to your full reward, and I feel sure you would earn that reward, if it was understood what dental charges are. I believe they are always most moderate, but there have been so many black sheep in your ranks, who have mulcted those who have fallen into their hands that people hesitate to seek dental assistance without knowing what the charges will be. Many have, I think, been deterred from seeking an interview with the dentist not so much from the fear of the extraction of the fang as from that of the extraction of the fee. One moment longer: It has occurred to some ingenious persons, that as teeth and hair are both cuticular appendages they might very properly be treated together, and so barbers—fierce, unscrupulous barbers—have taken to teeth scaling. Now taking this as a principal, just as hairdressing naturally leads to dentistry so I would suggest that anyone following the avocation of a boot-maker should take up gout, as it affects the big toe, and we might then shortly be able to dispense with men like our Chairmen, their duties being henceforth relegated to the disciples of St. Crispin. Really, gentlemen, the folly and gullibility of the public, notwithstanding the education which has been spread abroad, is astonishing, and one of the most painful features we have to contemplate; it is almost more painful than the rapacity of those rascals who prey upon it. It cannot be too widely proclaimed that teeth-scaling requires great and special skill, and much mischief may be done when it is conducted by the hands of hairdressers. Gentlemen, in conclusion I beg to express my interest in the National Dental Hospital, in its past students, many of whom are personally known to me as admirable contemporaries of your profession, and in its present students whom so far as I can judge, are

well capable of taking the place of the past students, when their innings is over. I propose the Toast of the past and present students of the National Dental Hospital coupled with the names of Mr. W. R. Humby and Mr. H. J. Relph.

Mr. W. R. HUMBY having responded on behalf of the past students, Mr. H. J. RELPH in responding for the present students said —

Mr. Chairman and Gentlemen,—For the present Students I have to thank you most cordially for the great honour you have done us in coupling our names with those of the past students, and we feel it is a much greater honour to be associated with the illustrious past than to have had a Toast all to ourselves. We think it a very great honour to be students of the National Dental Hospital, and look upon it as one of those marks of favour which fortune bestows only on the few. We also feel a sense of responsibility in as much as the reputation of the hospital is somewhat in our hands, and that we must endeavour to attain that high standard of excellence which has always been obtained by past students. We are proud of our Dean, our Surgeons, and our staff of instructors. To the helpless beginner, a surgeon, as a surgeon, is apt to be somewhat awe-inspiring, but I feel sure that our surgeons remember that there was such a time when theirs was a similar case, for they come to our aid with a kindly sympathy, which I think must be born of some such recollection. This friendly feeling is one of the best recollections of the students after they have left the hospital. Thank you for the honour you have done us, and I hope we may long prove worthy of it.

Dr. JAMES MAUGHAN proposed “The Visitors,” as follows.

Sir Dyce Duckworth and Gentlemen,—It is my proud privilege to propose the next toast, that of the visitors, and when I was asked to propose that toast, by letter from our kind and dear Dean, I ran through the names of my colleagues, and I said surely this man could do better, surely there is another more eloquent man than I; why should I have been chosen? and then I saw later on in the letter that there were some University men to be present, and being an old University man I thought that the occasion was one I ought to be glad of having, as I might return, in a very feeble way perhaps, my thanks to my old University teachers, for the kindness and patience they exercised towards me, and I have to thank them in the name of our staff for coming here to-night. And so on looking around the festive board, I see six University men, men for whom I have the profoundest respect. I see before me the present President of the Royal College of Surgeons. How well I remember his comfortable chair, he with his legs crossed, and we poor students looking forward to the ordeal of the College of Surgeons. How patiently, ever patiently, listening to our errors, and kindly, and in a fatherly way, correcting them. He won our esteem and our love, let me say, by that very kindly way, for there are more ways than one, of correcting a student, and we appreciate the way that Mr. Heath chose to teach us the Art and Science of Surgery. Those were splendid drills we got then. We did not perhaps go into t

minutest depths of surgery, but there was that ring of practical science that charged every word that passed Mr. Heath's lips. They ring through our ears when cases come before us in practical every day life, and his teaching is a teaching that will not be lost on the other members of the staff of the University Hospital. We see here also giants of the Dental Profession, but not being a dental man myself, I am afraid I should fall into some little error that my colleagues would be only too glad to lift me out of, and I will refrain from saying anything on this subject. There are others too. I speak of our Chairman, who has spoken words of wisdom to us, and I am sure not only from a staff point of view, but from a student's view, that we will ponder them as words for the future. Sir James Crichton-Brown has lifted us far above the level of worldly things, and has taken us into the realms of poetry and song, and I may say that at a dinner like this, we do appreciate Sir James. His services for the dental profession have won the esteem of dental men all over the country, and I am sure that he himself feels the truth of the statements he has made to-night, namely that there is a great future before dental men. Personally I feel very glad that he should have proposed the toast that he did. These words of cheer will ring in the ears of the students when they are far away. We hospital men are like so many posts. Students come, and students go, but we go on for ever. Gentlemen, I give you then this toast of the Visitors, and with it I couple the name of Mr. Christopher Heath, President of the Royal College of Surgeons.

In responding to the toast of the Visitors, Mr. CHRISTOPHER HEATH said,

Mr. Chairman and Gentlemen, I have to thank Dr. Maughan for the extremely grateful terms in which he has proposed this toast, and I have also to thank him for the interesting biographical details he has vouchsafed to myself and the audience. I stand here to represent the College of Surgeons, with which all you gentlemen are, or hope to be connected, and I may say in relation to what has been said to-night with regard to the advance of the profession, I should date a little farther back, and that is from the time when the College of Surgeons recognised the dental profession as part of the Surgical profession. We owe that to the late Sir John Tomes, and to the members of the Council of that day, long before the movement took place which culminated in the Dental Act of 1878. But if the Dental profession had not risen to the occasion, and presented themselves at the College of Surgeons, I think I may venture to say that Act would never have been passed. Now, gentlemen, we of the College of Surgeons are proud of the Dental Licentiates, and I venture to say to the Licentiates that they will help to assure the prosperity or the failure of the College to which we belong. I presume that some of you may have taken the trouble to read up the contemporary history of the College, and will know that we have had a discussion as to whether ladies should be admitted into the College. The Scotch board has already, as I understand, admitted one lady to their licence. Now I need hardly say that where one woman has got her foot, other

women will certainly follow, and therefore, I warn you gentlemen in time, that either you must be prepared to fight the ladies, or perhaps you had better join company with them. Now, gentlemen, having disposed of that part of the question, I have merely to thank you for your hospitality to-night, both in my own name, and in the name of the numerous visitors I see standing around me.

Mr. CUNNINGHAM in proposing the Toast of "The Chairman" said that first of all he must make a protest against the dinner Committee for putting him down year after year to the same old toast, and he compared himself to Andromeda, chained to the rock of the Toast to the Chair. He thought they would admit that it was a most difficult toast for the same man to propose on a series of occasions, and hoped they would forget his shortcomings. They had seen the admirable manner in which their Chairman had performed his duties, and would drink to his health with enthusiasm.

The Toast was received with musical honours.

Toast: The Chairman. Responded to by Sir Dyce Duckworth, M.D.

Gentlemen, let me return my most hearty thanks for the kind way in which you have received the toast which has been so eloquently presented to you, the toast of my health. I can only say that it has been a sincere pleasure to me to come here among you, and a very instructive occasion for me. I wish to remind you of one or two points before I sit down. Perhaps you are not aware that there is not only one, but there are two chiefs among you taking notes to-night. I am one of those chiefs, and the gentleman next but one to me on my right is the other. I see that you have amongst you to-night that distinguished member of your profession who has been appointed as the Inspector for the dental examinations. Most likely you are none of you aware that when that gentleman sends in his reports to the Medical Council, these reports are at once transmitted to me, to be strained and boiled down, to be presented in a somewhat concrete shape to the Council, and therefore I in the most secret manner possible have the means of knowing exactly what is going on in respect of Dental examinations in the three kingdoms. The President of the College of Surgeons spoke as to the desirability of women entering your branch of the Profession. Now as I have been in the Navy I am accustomed to fly my flag, and I make bold here to say whether you like it or not, that I am one of those who think woman is not a fit human being to be taught, or to learn, or to practise surgery or dentistry. I have thought over this question for many years, and I believe in the unfitness of woman, created as she is, for the possibilities of a profession like ours, and I have been told that women students of Dentistry, who have been undergoing studies for a Medical or Surgical diploma, present a most sorry sight when they practise Dentistry. I maintain that the average woman is not endowed with a sufficient amount of muscle or bone

to extract some teeth. We are told that they will only practise among women and children, but I hold that our women and children ought to be dealt with by people capable in every respect. I will only once more thank you most heartily for the way in which you have received this toast, and express my very great satisfaction in having presided over this meeting to-night.

Mr. RUSHTON then rose and said,

Mr. Chairman and Gentlemen, There is one Toast that is not down on the list, it won't take two minutes to propose, and it is the toast of our dear friend and worthy Dean, Mr. Spokes. I have known Mr. Spokes now for many years, and I have known him as an upright and honourable man. I am quite certain that anything that he does is for the benefit of our Hospital, and the results which have shown in the College since he has been Dean have more than justified what I have said in his favour. Gentlemen, I call upon you to drink to our dear friend the Dean.

In reply the DEAN said,

He must emphatically protest against this toast, as it was a most dangerous precedent. It was quite a surprise to him that they should wish to add this toast, and he was really at a loss to know in what terms to express his thanks. It was always his wish to satisfy not only his colleagues, but the students with whom he was brought into contact, and they must in the end recognise that they were all working together in the same line to produce the best possible results.

During the evening the speeches were interspersed with songs by Messrs. Alfred Smith, Appleby, Rushton, Wheatley, and Prim. Mr. Glassington also recited, and Mr. Harvey Löhr efficiently presided at the pianoforte. Towards the close of the evening Professor F. T. Roberts was prevailed upon to sing "The Pilgrim of Love," and this treat by a singer so well known in medical circles was much appreciated. "Old Lang Syne" by the company brought a very pleasant evening to a termination.

ROYAL COLLEGE OF SURGEONS IN IRELAND, DENTAL EXAMINATION.

Mr. John Stanton (Dublin), having passed the necessary examination, has been admitted a Licentiate in Dental Surgery of the College. The next examination is fixed to take place on Monday, February 10th, 1896.

THE AFFAIRS OF A HALIFAX DENTIST.

At the Halifax County Court, before his Honour Judge Cadman, an application was made for the discharge from bankruptcy of Charles Eugene Estabrook, who at the time of his failure carried on business as a dentist at Halifax.

The Official Receiver (Mr. Thomas England) reported that the debtor was made bankrupt on his own petition in April last. His liabilities amounted to £686, his assets realised £150 7s 9d., and a first and final dividend of 2s. 7½d. in the pound had been declared. Debtor commenced business at Halifax about four years ago with a capital of £160. He had also carried on business at Huddersfield and Manchester. Although he had a good business at Halifax he had wholly neglected it, and entered into negotiations for acquiring a similar business in London. During those negotiations, which were not successful, he had spent £105 on fourteen journeys to London. One visit alone, which occupied eight days, cost him £23 5s. 6d. He urged that the necessity of these journeys had not been explained. Debtor's neglect of business, the expenses incurred in the London negotiations, and his extravagant household and private expenses were the cause of his failure. As far as he had been able to ascertain, the debtor had expended outside his business during the two years preceding his bankruptcy £1,300.

Mr. Kerr, for the debtor, said that his client had carried on a very high class business. After a time, however, he found that he had not sufficient scope for his business, and that was the reason he entered into negotiations with a firm of London solicitors.

His Honour granted the discharge on the debtor consenting to judgment being entered against him for £98 2s., which would add 3s. in the pound to the dividend of 2s. 7½d. already declared.

FOR SETTING CROWNS.—W. H. Rollins recommends one part gutta percha and three parts vermillion, mixed with heat and careful working, for setting crowns, the combination being strongly resistant to the fluids of the mouth.

Southern Dental Journal.

DENTAL SURGERY IN THE FUCHAW!

A PROPHEPIC VISION OF THE 20th CENTURY.

By M. E. D.

(Scene.)

The study of Sir Brummel-le-Beau, M.A. Oxon., F.R.S., M.D., of London, Edin., Glasgow, Aberdeen, Durham, Dublin and Brussels, F.R.C.S., England and Edin.. D.M.D. Harvard, D.D.S., New York and Philadelphia, F.R.G.S. F.L.S.& F.L.S., President of the Medico-Dental Benevolent Institution, Ex-President of the British Dental Association, of the Odontological Society of Great Britain, &c. Referee for the "Big Wig" Life assurance Company, &c. &c.

Sir B. le B. seated.—Enter the Duchess of Yorkham.

Sir. B. le B. bows as he rises to greet his patient. The Duchess of Yorkham, *loquitur*. "Will you be so *very* obliging, Sir Brummel-le-Beau, as to relieve me of an aching tooth?"

"Pardon me, my dear and charming Duchess, but your request, though perfectly natural, is one which involves a great deal of consideration. Think, my dear Duchess, of my status and think of my shirt cuffs! My scientific attainments—aw—and—aw—my connection with so many learned bodies—aw—make me desolée, my charming Duchess, make me positively *sad*, believe me, when I am—aw—compelled to refuse your flattering request.

"But, my deaw Duchess, I shall not be heartless, I shall hand you over to my head—aw—assistant—aw—who has—aw—only 6 degrees, but who is, what is called by the vulgaw, a good opewataw! *He* won't mind soiling his—aw—shirt cuffs, confound it, no, my deaw Duchess! for I pay him handsomely and handsome is, you know, who—aw—handsome *does*, though twuth to tell he is ugly as a toad, though beautiful as an opewataw!—aw.—Haw, haw!

"He lives two doors off, Doctaw Crouchaw. If you will kindly present your visiting cawd, *he* will relieve you of your offending—aw—(thank you, my deaw Duchess,) *tooth*. I had quite forgotten the word for the moment.

"In the profound study of my science, one may be forgiven for forgetting so obtrusively vulgar and so howwibly common a word as TOOTH."

Bell rings. Exit Duchess—much impressed.

(Bell again). Butler announces "The Lady Abbey de Vestmeensteere ; Sir Brummel !"

Lady de V. entering with a question on her lips.

Sir B. le B.—"Do I fill teeth? (pardon the obnoxious word, Lady Abbey de Vestmeensteere) Cewtainly I fill—aw—teeth—aw—by deputy, *only* by deputy, don't you know ; I have a large staff of skilled arti.—aw—I mean, pwactionews.

The wooms are placed in alphabetical ordaw, ah, how many sleepless nights it cost me arwanging those wooms in alphabetical ordaw. At first I put C before B, and got mixed up sadly over the welative positions of M and N, but at last, by dint of hard work and constant application—aw—I managed it ! So, (brightly) you will kindly go first to woom A, then to C, (thank you) I meant to B, and so on.

My assistant in woom A, examines your mouth, and reports (by telephone) to woom B. In woom B the wubber-dam (a technical term) is adjusted, there also, if your teeth—aw—have to be sepawated, my assistant also attends to this—aw.

In an adjoining apartment—aw—he has a stack of well seasoned, and highly-scented woods. To run short of a wooden wedge would be a serious blow to my pwestige, as an awpowataw—by proxy, don't you know.

Then, of course, you will be transferred to the—aw—filling departments. Pardon me, but I never breathe the atmosphere of such purely and vulgawly mechanical departments. They suggest to the cultured mind—aw—an air so vewy unpwofessional that I feel quite ill if I venture to bweathe the vitiated aiw.

No ; my deaw Lady A. de V., I shall wemain heaw, immersed in more congenial studies and surroundings. I can, however, be communicated withat all times, by means of the telephone—aw—!

Now, as many of my assistants—aw—are alumni of the vawious Colleges in America, I pway you to be considewate and indulgent.

They are skilled, dental awtisans—aw—of *that* you may west *quite* suaw ! *Socially*, they leave much to be desired, I

am told, for I see them but little,—worthy fellows vewy, with wonderful finger—skill, and all that kind of thing, don't you know! But (with a big B) as WE understand the word, Lady A. de V.—not *quite* gentlemen—aw—a great pity—aw—but, alas, how can a fellah expect awistocwatic refinement from such democwatic sources!

They all possess the D.D.S. diploma. This ensures a knowledge of the anatomy of a—what-dye-call-'em—oh yes—thank you! of—a TOOTH.

You will theerfore place yourself with all confidence in the hands of these my cweatures—and opewataw.

I may just as well hint that they all like being called *Doctaw*! It also saves you the trouble and inconvenience of wemembewing names, a howwid—baw—!

Now, weally, my dear Lady A. de V., I must ask you to consult my head assistant, who will send you from woom to woom, till you arrive at woom Y—, where you will find your tooth filled.

At Y—, my footman will be in waiting at the exit daw, and will show you into my own pwivate bank—aw—. Here you shall be relieved of all embawassing and hawassing questions, and considewations as to fees. In my position (need I say it?) fees are nevaw handed to me personally. It would be a shwock to my feelings and to my dignity—aw—. Good morning, dear Lady A. de V. Good mawning!”

(Exit Lady A. de V., to have her tooth filled.)

Sir B. le B. touches the button, and enter powdered lackey.

“Oh, Maltravers, take my cawidge wound to Doctor Placebo's, in Varley Street, and tell him, with my compliments, and that kind of thing, that I am tired out by a hard mawning's work, *that* deaw Lady A. de V's case has taken it out of me, Maltravers! one has so much thinking to do for one's patients, and so much *study*—aw—!

Stop, Maltravers! Fetch me a glass of that old bwown shewwy, and, ah, a sandwich; and, Maltravers, I am unable to see any more patients to-day. This is your owd—aw—Maltravers, attend to me!

Sir Brummel le Beau is completely pwostwated by overwork. Sir B. le B. can see no patients till the day after tomorrow.

Patients like to hear that one is—aw—overworked, and, pon honaw, it is only the twuth. Deaw Lady A. de V., I'll make her pay for my exhaustion.”

In due course Dr. Placebo calls and is shown in.

"My *dear* Sir Brummel, what have you been doing? Your pulse is flabby and weak, and your tongue is white and furred. Your eyelids speak of anæmia, and your *toute ensemble*, of nervous prostration.

The old story! overwork? Ah, let me see. I saw your bulletin as I came in, a very wise arrangement. Come now, what say you if Doctor Placebo sends you on to Doctor Brighton? Capital physician is Doctor Brighton. No tonic like sea air, for an overworked London practitioner. Wire for rooms at the Palace Hotel. Drive there this evening, sleep two nights, and return day after to-morrow. Ta, ta, Sir Brummel."

Exit Dr. Placebo.

Curtain.

APPOINTMENT.

W. Francis Mellersh, L.D.S. R.C.S. Eng., to be Hon. Dental Surgeon to the Thames Ditton Cottage Hospital.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. No notice taken of Anonymous Communications: name and address must always be given, although not necessarily for publication.
3. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
4. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
5. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
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British Journal of Dental Science.

No. 670. LONDON, DEC. 16, 1895. VOL. XXXVII.

INAUGURAL ADDRESS.*

By DAVID HEPBURN, L.D.S. Eng.

GENTLEMEN,—In occupying the chair of The Odontological Society of Great Britain this evening for the first time as your President, it is not my intention to deliver to you a lengthy introductory address. Indeed I would willingly forego the ordeal altogether, and at once proceed to the more important business of the session, but in a wisely conservative Society such as this, it would ill become me to depart entirely from a time honoured custom. Bending, therefore, before the inevitable, I crave your indulgence for a few minutes.

At a recent banquet given by this Society, Sir William Flower, whom we have the privilege of numbering amongst our honorary members, made pleasant reference to the hereditary principal displayed in our list of Presidents, and it is a remarkable fact that in thirty-nine Presidential years, no less than six sons of former Presidents have been chosen to fill the chair. This, I venture to say, is a wholesome and healthy sign, indicating that the good traditions of the Society are not likely to die out; and when we consider the fact that each has been elected on his own merits, and by the voice of the whole Society, we need not fear that any ill-

*Delivered before the Odontological Society of Great Britain.

natured charge of nepotism can be laid at our doors. Another point of interest in our Presidential list is the fact that four gentlemen have been twice elected to office after considerable intervals, so that the links with the past have been thus further strengthened and maintained. History also at times repeats itself. It fell to my father, during his Presidential year, to represent the Society at the funeral of Mr. Arnold Rogers, of honoured memory, who was so largely instrumental in bringing this Society into existence, and who ruled over its destinies with such fostering care during its earlier days; and to me, your present President, came my first and I trust saddest official duty of representing you, when the great father of our profession, Sir John Tomes, was laid in his last resting place. This is not the time or place to speak of the mighty work done by him. We, as members of this Society, whilst mourning his loss, have only to feel grateful that he was spared to a ripe old age, that he was able to see in great measure the results of his unostentatious but never ceasing labours, and that he left us crowned with all the honours that a grateful profession could bestow.

In the memoir of this great man which has recently appeared in the pages of the *Journal of the British Dental Association*, we trace his guiding spirit throughout all the onward steps of our professional progress, and let us hope that even a fuller history of his unrivalled career may yet be forthcoming to quicken and encourage those who continue to carry on the great work in which he took so active a part, and to inspire all the future members of our specialty with the full dignity and responsibility of that profession of which he was so bright an ornament.

As the older friends of the Society pass away, and no less than sixteen of our former Presidents, and many honoured original members, are no longer with us, the ranks of the Society have been filled with not only a second, but I may

almost say even a third generation of dentists, and to those of the original stock who remain, it must indeed be gratifying to see the Society founded by them on so sure a basis ever increasing and prospering, and becoming year by year more and more firmly established amongst the scientific societies of the land.

Although a matter of comparatively recent history, so rapid has been the progress of dental surgery in this country, that our later members may hardly realise how much the present position of our profession is due to the influence and actual initiative work of the Odontological Society in past times. I must, therefore, be pardoned if I briefly remind them of it.

In the decade preceding the formation of our Society, weary and disappointing, vague and unsatisfying must have been the efforts of those high-minded practitioners who realised the burning necessity of some steps being taken for the consolidation of the profession and the future education of the dentist.

The natural reluctance of the College of Surgeons to take to itself a specialty little practised, less appreciated, and for the acquirement of which no recognised educational system existed, not unreasonably suggested to the minds of many that a solution of the difficulty might be found in organising a separate institution, which should be to dentists what the College of Surgeons was to surgeons. A few there were who considered that a medical or surgical degree with a little special technical knowledge picked up subsequently at haphazard, summed up the needs of any who desired to practise the specialty, at the same time ensuring a certain degree of respectability. But luckily there existed those who saw further into the future, who realised from their own dearly bought experience the full needs, educational, ethical, and political, of the dentist; who believed that while special education and training of a comprehensive character were an

absolute necessity, at the same time association with an established medical or surgical body was the only means by which dentistry could be safely raised from its then chaotic condition and firmly established, as it deserved to be, as an integral portion of the great healing art.

The struggle between opposing factions was a hard one ; but happily for us, the wiser heads, although in the minority, prevailed. After many and mature deliberations the Odontological Society was established in 1856, and soon, by force of reason, won over even its most stubborn opponents ; then all worked together for the common weal. One of the earliest undertakings of the Society was the foundation of the Dental Hospital of London and London School of Dental Surgery. It suggested a curriculum in which prominence was given to the requisite training for the attainment of special technical experience and the necessary manipulative skill, combining with these a sufficiency of anatomical, surgical, and general medical knowledge. Thus prepared, the College of Surgeons was once more appealed to, and this time not in vain.

The history of the granting of a Royal Charter which empowered the Royal College of Surgeons of England to institute a department in dental surgery in the year 1859, is too well known to dwell upon, but we must ever feel proud to recall the fact that our Society sowed the good seed that has since fructified so richly. If any course other than that adopted by the great pioneers of dental reform and founders of this Society, who by their exertions linked us indissolubly with the Royal College of Surgeons, had been followed, I venture to say the Dentist's Act at this date would have loomed only a dim phantom in the distant future, or a consummation devoutly to be desired, but hopelessly unattainable.

Thus it is impossible to dissociate the Odontological Society entirely from dental education and political progress, but in the phenomenally rapid evolution of which it was the germ,

other organisations have developed, whose peculiar province it is to watch over these things. The Society, therefore, has leisure to quietly pursue its own ends. It is indeed a pleasant resting place in the still turbulent life of a young profession, for dental politics have no longer any place in it; science alone holds sway. It has been likened by an honoured leader of modern time to a still oasis, where the wicked cease from troubling and the weary are at rest. Long may it remain so.

I do not for one moment mean to imply that the Society is inactive, far from that. It has done a great work in the past, and it has a great work before it in the future; indeed in one way it is capable of exercising even a wider influence than any other existing dental institution. One important feature is the fact that it is the chief medium by means of which Odontology is brought into immediate contact with kindred sciences. Again, it forms a common debating ground for vexed questions on points where general and dental pathology and practice meet, as many invaluable papers by leading medical men read and discussed at our meetings can testify. The interchange of our publications with those of learned societies at home and abroad, is a feature also which must not be overlooked. With regard to our own intrinsic recorded work, this has always been accessible to our profession, and few, if any, subjects relating to our specialty have been left untouched by the Society. Our lengthy series of Transactions evidence this, and I feel sure the perusal of these in leisure moments will clearly show, better than anything else, the sure and steady advance of dental science during the last nine-and-thirty years.

That the Society might do something in the way of endowing research is a point I refer to with delicacy. On the question of its desirability I have no doubt in my own mind, but we must not lose sight of the fact that although a wise

and careful policy in the past has enabled us to accumulate a small reserve fund at this epoch, we know that ere long a large demand may be made upon it. Our home is but temporary, and although our child, "The Dental Hospital of London" has up to this time been able to treat its parent with leniency, there is no saying what may take place when the present premises have to be abandoned. I, therefore, during my term of office, shall feel bound sacredly to harbour our resources, none the less hoping that in the near future the Society may be in a position to expend adequate sums for the encouragement of investigation and research, and also for the still further improvement of our unique museum, and the extension of our library.

Meanwhile, I believe we shall not lack material on which to base our discussions, for new pathways of experiment and inquiry are daily unfolding themselves in the ever broadening plain of modern dental science. and we may rest assured that the voluntary work which has not failed us in the past will continue to be our portion in the future. Our voluntary work will, I believe, always be the best—if undertaken, as Sir James Paget once said, when addressing an audience interested in dental surgery, "by high-minded men, who resolve that the work to which they give themselves for their profession's sake shall be done in the best possible way, with a constant tendency to advance higher and more high."

There are, however, lines of research which cannot be carried through without considerable outlay—vexed questions needing for their solution the laboratory and its appliances; questions which might be worked out by young enthusiasts, of which our profession claims not a few, possessing the time and the ability, but lacking the means, and it is in this direction that the Society will do well ere long to turn its attention and lend its aid. In doing so it will but be following in

the wake of older societies, which have already found such a course expedient and useful.

Since the last meeting of the Society the world of science has lost two of its greatest lights—Pasteur and Huxley. The stupendous and revolutionising work of the former will probably be more fully realised by future generations than it is by ourselves ; but with the latter, Professor Huxley, we are in closer touch, for he was a keen odontologist, and moreover an honorary member of our Society. His interest in the progress of dental science was evidenced some years ago when, amidst his multifarious duties, he found time to preside at the annual distribution of prizes at the Dental Hospital of London and deliver a lengthy address full of wise counsel and sage advice. To this great man it is proposed, under the auspices of the Royal Society, to promote a national memorial—a project which this Society, of which he was so distinguished a member, will, I am sure, be proud to support.

I have referred to these two distinguished scientists because I feel the lesson of their lives is one which all those who cultivate the pursuit of knowledge, even in the humblest way may well take to heart.

And now, gentlemen, I am conscious I shall be acting most in accord with your feelings if I bring my brief remarks to a close, especially as my honoured predecessor, Mr. Canton, has left me a legacy in the form of an adjourned discussion, which will more profitably occupy a considerable portion of the time at our disposal this evening. It only remains for me, therefore, to thank you most heartily for the honour you have conferred upon me by electing me to preside over you. This honour and your kindness I appreciate to the full. I am aware that, in an introductory address, according to prescribed usage, I might have devoted considerable space to apologies for my own unworthiness, but so self-evident a fact I have been pleased to pass over without notice. As your

chosen President for the year, my time and services, such as they be, are entirely at your command, and with my able secretaries helpful Council, and your never failing support, I have no fear but that the work of the session will be profitable and useful, not only to ourselves, but also to the profession at large.

DENTAL MECHANICS.

By HARRY ROSE, L.D.S. Eng.

Lecturer on Dental Mechanics, National Dental Hospital.

PLATE WORK.

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(Continued from page 1070.)

Before leaving this subject, it might be mentioned that when drawing long lengths of gold wire to make spiral springs, the wire after being pulled through the plate for a certain length may be coiled around a large wooden roller, and the further drawing proceeded with. In order to render the wire springy it is kept annealed to within the last five or six holes of the required thickness, after which it is left hard.

I am indebted to my friend, Mr. W. R. Humby for the following illustration of a machine for making springs. (Fig. 7.)

When proceeding to make springs, the end of the length of gold wire is first passed through an agate hole 'to burnish it' and then carried upwards, the end fixed to the small chuck which carries the thin steel mandril, (represented by the top

line of the diagram) on which the wire is wound. Tension is made on the wire by means of the weights shewn on the left of Fig. 7, and the handle on the right is to wind the wire on to the mandril. When a sufficient length of wire is coiled on the mandril, it is removed and then cut into lengths of the required size.

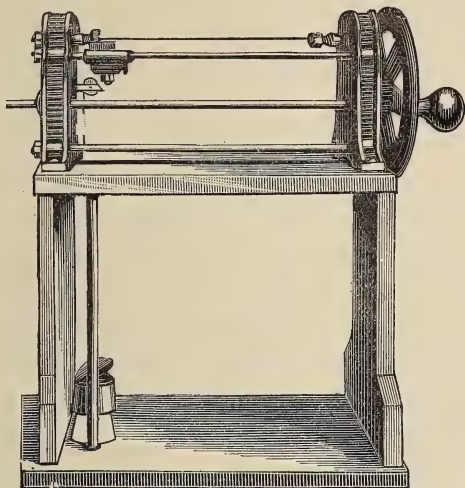


Fig. 7.

Springs range in strength from about No. 6 to 10 according to the thickness of wire used. Sixteen carat gold is usually employed for the best quality springs, and it must be of extreme toughness, or else it is unfitted for the purpose.

GOLD PLATE WORK.

Before commencing the descriptive part of this subject one may be excused for saying a few words on the important part it takes in dental mechanics.

Those who have had the opportunity of observing, and examining, the work turned out by a large number of students extending over a considerable number of years, must have been struck by the fact, that gold plate work, which consti-

tutes so to speak the very backbone of our mechanical art, the basis upon which its existence depends, and which enters into and forms the foundation of its most artistic efforts, is rapidly and surely deteriorating both in character and quality.

That this is so is much to be regretted, for it is this work that gives the student the greatest opportunity for the exercise of his mechanical ingenuity and manipulative skill; it also calls into play his inventive faculty to a greater extent than any other kind of work that he may be called upon to perform.

The falling off in the quality of the work may be put down to several causes. First, the advent of vulcanite; this has in a great measure been the cause of the mischief, owing to the fact of its being more easily manipulated, and at the same time supplying the demand of the public for a less expensive denture.

Secondly, to the short period of pupilage now existing, namely three years or perhaps only two. It can thus easily be understood that the present student cannot possibly hope to compare with one who had served five or perhaps seven years. In the case of the older student, he not only had the opportunity to acquire all the details of his work, but he had time also for extensive and useful practice, thus enabling him to work well and rapidly, ready at the end of his time and fit to go into the world and earn his own living. Could one say this of the present short time student? Nothing demonstrates more forcibly the old proverb that practice is better than theory, than does this branch of our art, and taking into consideration that one's success depends so much upon manipulative skill it certainly points out either the advisability of a longer course of dental mechanics, or that every effort should be made on the part of the practitioner that his pupil should cover the ground in the three years and get a fair insight into all the details of his work.

To attain this end it becomes necessary to proceed on a

system, dividing the work up into sections or stages, and seeing that the pupil attains a fair proficiency in the details of one, before he is advanced to the other. The pupil may with advantage devote the first six months of his time to plate work, using German Silver in the place of gold. This will not only teach him how to use the file, sculptor, saw, and other tools in a proper manner, but will also educate his hand so as to acquire the necessary delicacy yet firmness of touch, that distinguishes the trained dentist.

In preparing the models for casting, in making dies and counters, and in generally exercising himself in all the details of swaging plate and strengtheners, he will find the time well and profitably filled up.

During this period also, he may vary the programme by making small tools necessary for his work, such as drills, screwplate and taps, etc.

Backing teeth in the ordinary way, and also to produce a biting surface, fitting clasps to models to illustrate the varieties used for different teeth, and also in making swivels are useful exercises. He should also be enabled to acquire the art of alloying, melting, and refining gold in the rough and ready, though practical, way usually observed in the dental work-room, and we trust by a careful perusal of these pages, the student will be enabled to practically prepare many of the materials of which, in the future, his cases will be made.

If the student is well drilled in the details of plate-work, he is then able to bring a much more artistic mind to bear on the working of the more easy plastic materials, and to realise that he has to exercise as much care in the manipulation of the latter as in that of the former.

The next six months may be devoted not only to the making of plates but also to the fitting of teeth, both flats and tubes. He may also with advantage, fit a number of bone blocks and be taught to carve the teeth up in a natural and artistic

manner; this will enable him to educate his eye to the different surfaces of a plate, and after a time by practice he will be able to make an approximate fit either of a tooth or a block to a plate, without having recourse to red paint, except for the purpose of fine fitting. It will also teach him the relative position of teeth in different parts of the mouth. He ought at this stage to learn to discriminate between one tooth and another so that when mounting, he fixes them in their proper places. At this period also he should be taught the use of a bite or articulation, its object and how to make it efficient.

At the end of the first year he may vary his work by making combination cases, such as German Silver and vulcanite attachments for the teeth.

He may also make metal teeth, using an alloy of copper and silver, for short bites. These he can mould up in composition so as to make them fit both the bite and the plate and also have a fairly natural shape.

Then, in addition, we have the mounting of swivels to plates and mounting sets of teeth on wax and other base-plates. These latter need not of a necessity be vulcanized, but are only meant as studies, for the artistic arrangement of the teeth and to acquire neatness in moulding.

At the beginning of the third year, a study in crown-work may be added advantageously to his other duties, also the making of regulation cases, the methods of making obturators and artificial vela. The student should also now be given cases to make in the nobler metals, and undertake as large a variety of cases as possible.

Where it is possible, without the likelihood of injury resulting, the student should be encouraged to use his own discretion and judgment but if at all uncertain he ought to ask for information, and be encouraged to read all the literature he can on his mechanical studies.

(To be continued.)

THE SIX-YEAR MOLAR.*

By Mr. CHAS. B. DALBY.

In the evolution of the supreme animal Man, Nature seems to have got a little mixed in the multitude of details. Among other things she will have to answer for, not the least is the formation and development of the first permanent molar.

At the time of the appearing of this imposition, the unsuspecting innocent infant has but recently got over the complete eruption of the temporary set. While this has been going on, hidden beneath the crimson curtain of the gum, Nature has been weaving a web that is destined to have a powerful influence on a future race of teeth. By the time the second temporary molar is completely erupted, the crown of the six-year is fully formed, and soon its surface begins to protrude above the gum, the white enamel having a sinister gleam against the shining membrane ; for the six-year is the villain of the piece. Often enough before it has begun to show very long it is seen to be diseased and only seems to cause discomfort and pain almost unendurable to the unfortunate possessor. The disease gradually penetrates to the pulp, and if the patient is possessed of a pulp which dies away painlessly nothing will be noticed till at last trouble begins to brew in the shape of an abscess and swollen face. Then the dentist is applied to and he eliminates the offender and peace and happiness reign once more. Perhaps the decay is not so rapid. The six-year grows up to maturity with only a comparatively small decay, but the teeth of the permanent set gradually grow and form and erupt and nestle together round the culprit. Their confidence is betrayed for the six-year is soon found to be a hot-bed of rampant micro-organisms which spread to the contiguous molar and bicuspid and they

*Read before the Students' Society, Victoria Dental Hospital, Manchester.

in turn convey the hateful contagion to their neighbours, and so the process goes on and death and destruction are disseminated all around by this horrid relic of a bygone age. Sometimes, however, the child is brought to one of our profession at an early age, say eight years old. The six-year is decayed only partially, but is aching fearfully so the dentist extracts it, pockets his fee with the assurance to the patient that another tooth will come before long to take its place, and again all is calm and serene, for the present. And presumably, it is much better to be rid of such a plague for a decayed tooth like that would only have caused others to decay. The number of six-year molars extracted in this way, I should say is simply enormous. You will remember the table given by Sir John Tomes in the "Dental Surgery." in which out of 2638 extractions 1090 were six-years. From my experience at this Hospital I should say a very large percentage of extractions I have done have been six-years. What is the cause of this? The fact is that temporary teeth are seldom filled. They are left alone to decay and so when the six-year comes it most likely has for a neighbour a decayed second temporary molar. Then decay begins in the fissures and extends till almost the whole crown is gone.

The mistake is at the beginning. People will *not* look after their children's teeth. One would think that after the exuberant joy with which a happy young mother greets the appearance of baby's first tooth, that she really would take an interest in, and keep a watchful eye on the temporary teeth. But no. After the first three or four teeth and the second or third baby she loses all interest till one night she is punished by hearing the sound of weeping, and a little voice dolefully says, "Willie's got tooseache," and she has to stay up all night. Then the visit to the dentist again and the tooth is not filled as in a great many instances it really ought to be, but is taken out. Sometimes the dentist is to blame, or per-

haps he has an extensive practice and wants to get along quickly and a lot of people are waiting and so out it comes. In one or two instances I have seen a mother refuse to allow a child's tooth to be filled, because "it'll be just as bad after, I know it will," and she bounces out in her confidence and righteous indignation. Sometimes, Willie is cantankerous and the dentist takes the tooth out to get rid of him. Without doubt there is folly on both sides and excuses may also be made for dentist and patient.

Opinions are so varied concerning the extraction or retention of the first permanent molar that a poor student is apt to get a little confused. But of this golden rule, Dental Surgeons everywhere seem to be assured, that no six-year molar ought to be extracted till the patient is at least 13 years old. This rule is not kept. Scores of them are extracted too soon. The fact of the matter is that the six-year is not a villain at all. He is a hero standing single-handed in the breach and bearing the brunt of mastication when the temporary teeth are fast becoming loose and useless. And instead of reward in the time of ruin and disaster, he is plucked forth and cast into the outer darkness of the surgery spittoon.

In a paper in the Journal for October 1894, an American dentist (Dr. Sanger) even goes so far as to say that even if more than half the crown of the six-year is gone a gold band should be made to fit round the tooth and filled inside with cement and amalgam. This is certain, that many first permanent molars are early decayed and become abscessed and have to be extracted on account of inattention to, and utter ignoring of, the condition of the temporary teeth in the first instance and the six-year itself in the second.

However, it not seldom occurs that the six-year outlives the strife and resists the fierce onslaughts of the armies of the alien and emerges triumphant and invulnerable from the

conflict. But again his doom is sealed. Fate seems to dog his roots. For now he becomes a martyr to the cause of Order and Regularity. It seems that there are too many teeth in the human maxillæ. When a young patient appears with outstanding canines and generally crowded front teeth of the permanent set it is becoming the custom to "look at" the six-years if they are there and perhaps all four are extracted. The results in a great many cases are decidedly beneficial. For by their central position they are eminently fitted for this office. Their removal makes room for the front teeth and for the back teeth also to take satisfactory positions for the prevention of contact decay, and for the proper occlusion of the bite. But a good deal of discretion must be exercised in this matter, as so many considerations weigh in favour of or against this mode of treatment in each case, that comparatively few are entirely satisfactory. For instance it may happen that the six-years are perfectly sound in a crowded arch, but the first or second bicuspid more or less decayed. Then it becomes a debatable question as to which teeth to sacrifice, and one sees at times two Dental Maestros quite at variance on this question.

That the extraction of the sixth-year is successful in many instances however is beyond doubt. One can never tell where it will end though. If the civilised jaws continue to dwindle in size till in the process of generations and centuries the teeth become a vanishing quantity a very interesting problem arises. Will the coming race be edentulous? Time will show.

I have, as I suppose you will have noticed, said nothing about the six-year with a faulty organisation. And moreover that in many cases of disease the early extraction is perfectly justifiable. I might also observe that when the incisors are affected by honeycombing or syphilitic notches, the six year

molar is often affected, in the latter case becoming conical shaped.

A great deal might be written on this most interesting subject, for the six-year is a sort of transition between the temporary and permanent teeth and will always be worthy of notice even on that account. I have endeavoured to show what has really been often shown before that the first permanent molar as Villain, Hero, and Martyr is not unworthy our closest consideration and attention.

NOTE FROM A PATIENT.

Late in the year—my heart and frame are chill!

By Jove! I have not paid my Dentist's bill!

Ha! Ha! Perhaps he will receive it now.

I cannot say that all my cash was spent;

Nor why his dues so long were never sent;

He'll set the Sheriff on my heels, I vow.

Have we not heard his talking is a treat;

He makes it possible for ancient men to eat

He's not the sort of man to make a row.

Late, late, we'll send a cheque with heart contrite,

And him for valued services requite,

If money matches merit, anyhow.

EREMUS.

November 1, 1895.

REPLY.

A man that can a poem write

About his Dentist's bill,

Must have good pluck, as well as cash,

Say nothing of the quill.

With many thanks I now return

Receipt account to you!

So very different from the way

I often get my due.

British Journal of Dental Science.

LONDON, DECEMBER 16, 1895.

CASES IN THE COURTS.

It was only the other day that we referred to the criminal prosecution of two men who assumed the functions of dentists, to the injury of the Public's pocket and teeth. Now we have two other dento-legal cases to record, each in its way exemplifying the relations between the Profession and the Public. In a recent after-dinner speech, SIR JAMES CRICHTON-BROWNE expressed the opinion that the public might be encouraged to seek dental assistance if there was a definite scale of fees. This may be so but, as in medical affairs, it is an extremely difficult point to arrive at. Any approach to such a scale must lose a good deal of definiteness in the necessary amount of elasticity to be provided for unforeseen contingencies. Now in one of the legal cases to which we have alluded, there was in existence a scale of fees, at all events on one side. The difficulty arrived when the patient and her husband repudiated any knowledge of the scale as published in plaintiff's book, and wished to substitute one under which the husband had previously received treatment. Mr. COMER claims to be practising as a specialist in "advanced American Dentistry," and from the report of the evidence we gather that he is *very* advanced, for newspaper accounts make him say that "removable bridge-work had never been done by any dentist but himself," and that he always made a duplicate set. We imagine that he was referring to some special construction of his own, and perhaps this will account for the absence of any corroborative evidence for the plaintiff that the work was worth the money. On the

other side Mr. TOMES, F.R.S., and Mr. W. B. PATERSON, both testified that the work was very ordinary, and that the charge was excessive. The sum sued for was one hundred guineas for a removable four-teeth bridge in duplicate ; it seems there was also a "key" as part of the outfit, but we may take it that the plaintiff values his work at, at least, twelve guineas per tooth. The defendant had paid fifty guineas into Court. Mr. Justice MATHEW directed him to have twenty returned with costs of the action.

Students of the ordinary bridge-work system will notice that both the defendant and his wife had had previous experience of this form of artificial dentures, and had got into trouble with fractures. No doubt they hoped that with the Comer system further trouble would be obviated. In the absence of the necessary *special* knowledge we can express no definite opinion upon the point. There is, however, we believe, too much inducement held out to the public that bridge-work is the best, or at least available, in any case. Good and satisfactory results for permanency can only be obtained by properly selecting suitable cases, and one of the most desirable ends to be attained is that the patient should be able to rely upon an impartial opinion as to what is most suitable for his case. He needs advice as well as a denture, and until a bond of professional confidence is established between the operator and patient no scale of fees will prevent unpleasantness. We are now speaking generally, and our comments must not be taken to refer to any individual case. With regard to the action of COMER v. GWYNNE we may congratulate both parties. Each thought he was in the right, and had the necessary courage to test the matter in Court. The plaintiff may have thought that he was helping to establish for his brethren that scale of fees to which Sir J. CRICHTON-BROWNE referred, but at all events he does not represent Messrs. TOMES' and PATERSON'S views, nor, we may add, our own. For the defendant, even greater courage was required ; but he too, no doubt, felt he had a duty to

fulfil towards his fellows in resisting what he thought was an unjust claim. It is well-known that very few have the moral courage to act in like manner.

The other legal case, a report of which also appears on another page, was apparently a case of "covering." An unregistered man was charged before a magistrate for saying he was a dentist, and a fine of £10 and costs was imposed. The defence was that the defendant was a mechanical assistant at a branch practice, but no attempt seems to have been made to deny the use of the word "dentist." Mr. COTTELL, registered dentist, of Hastings, said he acted, at the branch practice at Forest Gate, as *locum tenens* for another registered man whose name as spelled in the reports, does not, however, appear in the Register. We do not find there a "Mr. H. J. BRADLAUGH." We can only discover a Mr. Henry Jacob Bradlaw, of Dublin, and we cannot say if this is the gentleman referred to. According to Mr. COTTELL's evidence, he himself attended the branch practice when required, but when challenged to mention an instance of his seeing a patient there, he was unable to do so. The magistrate described the "association" under which the practice was carried on as "bunkum." Counsel for the defence suggested that he might possibly appeal, so we refrain from further comment except to say that we shall be glad if the suggestion is acted upon, and that out of respect for the General Medical Council it will be well for all branch practices to be in charge of registered men.

ANOTHER BACILLUS IN THE MOUTH.—M. Gembert has read a paper at a meeting of the Therapeutical Society in Paris, in which he stated that the *Bacillus Coli* has been found in the mouth of healthy persons. In sixty such cases the organism was found in twenty-seven. Thirty-six experiments were made to ascertain the chief locality in which the bacilli may be found, and in more than half the tonsil appeared to be the seat.

IODINE AS AN ANTISEPTIC.—At a meeting of the German Naturalists and Physicians, Herr Soeb, of Aix-la-Chapelle, read a paper in which he alluded to two classes of iodine preparations. Most of those in use belong to the first, in which free iodine is given off in the system and iodoform poisoning is caused in this way. Nosophen belongs to the second class ; it forms with albumen an iodine combination which has a bactericidal action, and is again decomposed, leaving the system in its original form.

A STYPTIC COMBINATION.—In the Philadelphia *Medical News*, Roswell Park describes the advantages of using a mixture of antipyrin and tannin to stop bleeding. He had previously been in the habit of using a five per cent. solution of antipyrin in the form of a spray to check oozing in surgical operations, but in a case of intractable bleeding, after the removal of adenoids, he added antipyrin in powder to an alcoholic solution of tannin. This combination resulted in the formation of a gummy mass, some of which, used on a sponge, at once stopped the hæmorrhage. He has since found that the two substances may be mixed in any proportions, and there is only one difficulty in connection with the application of the sticky precipitate. It is so remarkably adhesive that after the desired result is obtained, it is difficult to remove the cotton wool on which it has been applied, and it may be necessary to wait until granulations have formed.

USE OF NERVE BROACHES.—By placing a small square of rubber dam (about one-tenth inch square) on a fine, straight, broach, and passing the latter within a pulp canal to the apex of the root, the point will catch upon the internal shoulder of the foramen, and the rubber guage can be adjusted at the level of the most prominent coronal point or cusp. Withdrawing the broach, with care not to disturb the guage, the length from guage to point can be transferred to a piece of orange-stick by notching, and the stick marked with patient's name, tooth, etc. This standard measure can be preserved for use in adjusting the guage on pulp-extractors, drills, dressing-broaches, and pluggers, when operating in that particular canal.

B. H. Douglass, D.D.S.

Dental News.

GENERAL MEDICAL COUNCIL.

November 29th, 1895.

SIR RICHARD QUAIN, President, in the chair.

The President said he had received the following letter from the British Dental Assistants' Association, dated Nov. 27th, 1895 :—

"Sir,—A deputation will wait upon you to-morrow (Friday) in reference to my Petition and others. at 7.45 p.m., at the Royal College of Physicians. Trusting you will receive us,
I remain, Sir,

Yours most obediently,
A. L. BURLIN."

Sir William Turner said that the deputation was now present. That was entirely out of order. If a deputation was to be called in, well and good, but at that stage no deputation could be present till the Council had consented to receive it. He moved that the Deputation withdraw.

Dr. Glover said they were entitled to be present as members of the public.

Sir William Turner saw that if that were so, he should move that the Council consider this question *in camera*.

Sir Dyce Duckworth seconded the motion which was agreed to.

Strangers then withdrew, and on their re-admission.

The President informed them that the following resolution had been passed: That the Council has already fully considered the question on which the British Assistants' Association wishes to send a Deputation to the Council, and not being prepared to depart from the decision of May 29th, 1891, cannot receive a Deputation on the subject."

NOTICE OF MOTION BY MR. BRYANT.

Mr. Bryant moved "that the Report of the Inspector, Mr. C. Tomes, on the Qualifying Examinations in Dentistry of the Faculty of Physicians and Surgeons of Glasgow, together with the Remarks by the Body inspected, be received and entered on the Minutes." He did not wish the matter to be considered yet.

Dr. Cameron asked the Council to pause before they entered that upon the Minutes, all the more as it was a matter which was not going to be considered at that session.

Those who had read the report perceived that there was considerable conflict between the Inspector and the Examiner, not on matters of opinion, but in regard to matters of fact, and he thought that by a little intercommunication between the Inspector and the Council of the Faculty, those difficulties might probably be cleared up. At the Board, as at all the Boards of the Corporation of Scotland, each student was examined by two persons, one who acted as Assessor and listened to the examination and noted down at the time on an official paper, all the subjects on which the examination took place. That was done in the present case, and they had records of the subjects on which each student was examined. The Inspector had found it to be his duty to make a very serious charge, viz., that two of the six candidates who passed should have been rejected, and he further gave some of the subjects taken up at both of those examinations. It happened that the subjects as so detailed did not agree with the list of subjects on which any one candidate was examined, so that as a matter of fact, there was no doubt whatever, that the Inspector was in error, and that he had got confused in regard to the particular men who were examined. The Council of the Faculty remarked in consequence "as regards the results of the Examination, the Inspector is of opinion that the candidates who passed and failed at the First Examination deserved the respective awards, but that two of the six candidates who passed at the Second Examination should have been rejected. Unfortunately the data on which he formed his judgment are not given at all in the case of one of these two candidates, and only to a very small extent in the case of the other. The Council submit that in recording such an opinion the Inspector was bound to state in detail the facts on which it was founded; and the obligation was all the stronger that he had no one with whom to share the responsibility. All that the Council on their part can say on the matter therefore is that they have not the materials on which to review the Inspector's judgment. If any over-marking there was, they have certainly no wish to extenuate it. It is simply a case of the Inspector's opinion formed, as has been explained, under circumstances which practically precluded an adequate judgment against that of the Examiners." There would also be found in those remarks by the Body inspected a statement which he (Dr. Cameron) had made that "he gives some of the subjects taken up at both, but it happens that the

subjects as so detailed do not agree with the list of subjects on which any one candidate was examined. The Inspector is therefore probably in error on this point. The list of subjects on which the candidate is examined, is taken down by the assessor on the candidate's marking schedule. These schedules were in the Inspector's possession for some weeks, (as were the written papers); this discrepancy appears to have escaped him."

Under those circumstances he thought it was undesirable to make those statements public property, and he had no doubt that before it was really necessary to put it on the minutes, some communication between the Inspector and the Council of the Faculty would clear up the matter. He was very sorry he had been absent at the Dental Committee on account of an accidental delay to the train in which he travelled from Scotland, or he would have mentioned the matter there. He thought Mr. Bryant would find it consistent with his duty to allow the Report to remain off the minutes till the council met again. It would be in accordance with the wish of the body which he (Dr. Cameron) represented.

Mr. Bryant said there was not the least objection to the suggestion of Dr. Cameron.

COMMUNICATION FROM THE BRITISH DENTAL ASSOCIATION.

The Registrar said the next business was to receive a communication from the British Dental Association, dated November 25th 1895, drawing attention to the fact that the Faculty of Physicians and Surgeons, Glasgow, accepted the dental curriculum of Michigan, a curriculum no longer recognised as satisfactory by the Medical Council in lieu of their own and admitted a student holding the D.D.S. diploma of Michigan University U.S.A. examination. They submitted that the action of the Glasgow Faculty was *ultra vires*, and asked the Council to take steps to prevent a recurrence of such action.

Dr. Cameron said he had no information with regard to the matter, as he had only just heard of it.

Dr. Bruce thought it was a pity that such accusations should not be made direct.

Mr. Wheelhouse moved that the letter be received and entered on the minutes.

Dr. Cameron thought they should have the matter settled by the Dental Committee before it was put on the Minutes. One did not know the truth of it in the least. He moved

“that this communication be referred to the Dental Education and Examination Committee.”

Dr. McVail seconded Dr. Cameron's motion. which was agreed to.

Monday, December 2nd.

SIR RICHARD QUAIN, President, in the chair.

The Report of the Students' Registration Committee was adopted and entered on the Minutes. The following is the portion of the Report relating to Dental business.

Sir Dyce Duckworth moved the following resolution : “That on and after Jan. 1, 1897, the registration of students under resolution xi, of June 2, 1891, shall be discontinued, so far as concerns the preliminary examinations of the Pharmaceutical Society.” He said that the Committee had sat and heard all the cases mentioned in the Report, and it was satisfactory to note that students were coming more under the regulations of the Council. It had been the custom previously to allow students who had passed the preliminary examination of the Pharmaceutical Society to register as medical students on taking the previously omitted subjects, but the Council wished to discourage that in future.

Dr. McAlister seconded the motion, which was agreed to.

On Monday, November 25th, the Executive Committee considered the following Memorial from an Association of Unregistered Dental Assistants, which has for some years been engaged in gathering together all cases wherein according to its judgment, a just claim is made out for registration:

“*To the PRESIDENT and BOARD of the GENERAL COUNCIL OF MEDICAL EDUCATION AND REGISTRATION OF THE UNITED KINGDOM.*

“GENTLEMEN,—We, the undersigned Dental Assistants, beg respectfully to bring before your honourable Board a grievance under which we suffer.

“Through a misunderstanding on our part at the time of the passing of the *Dentists Act*, 1878, we did not take the opportunity to apply for registration, as some of us were not out of apprenticeship, and others, who were assistants at the time, were quite ignorant of the Act.

“Some of us noticed Section 37 of the Act in the year 1882, some in 1883, and some at a later date, and applied for registration, but were refused on account of being ‘too late.’

“Since that time up to December 5, 1892, your honourable Board

have granted registration in about 400 cases (according to *Dental Register*, 1895); and we consider, as we applied before that date, the same privilege ought to be extended to us.

"We are all qualified according to Section 37 of the Act. We have been articled as pupils, and most of us have paid a premium to a qualified Dental Practitioner for the dental education we received, while some of us, who paid no premium, gave time in lieu of cash. Our articles expired before the first day of January, 1880. We have now been twenty, twenty-five, or more, years engaged in 'Dentistry'; we are all married and have families depending upon us, so that it is quite impossible for us now to turn to other callings.

"We therefore pray that your honourable Board will take our precarious position into kind consideration, and extend the same privilege to us as your honourable Board has been kind enough to extend to others.

"May it therefore please your honourable Board to admit us as 'Registered Dentists,' and to authorise the REGISTRAR to enter our names on the *Dentists' Register* upon payment of the usual registration fee.

"We remain, Gentlemen, Yours most obediently,

"A. L. BURLIN	G. W. MARA	P. GREENWOOD
THOS. PARKER	F. DONNELLY	F. G. SNARY
CHAS. GOTH	EDW. FOLEY	A. E. HUGO.
H. A. HALLIWELL	J. D. CAMERON	H. ALLWORTH
S. S. TOMKINS	M. HARRIS	W. H. IRBY
J. E. R. HARRIS	A. BINNS	A. J. WILKINSON
H. ROWLEY	J. L. WARTSKI	E. J. HORTON
J. H. PIMM	G. RUMBALL	J. A. DIDIER
V. L. BOBINSKY	M. MCSTAY	E. S. CHEVELL
A. F. MAPLESON	F. W. CHILDS	H. CORK
J. HARRIS	C. E. THOMAS	E. MASON
C. P. ELIESON	F. R. GREENWOOD	E. S. HORSFIELD
L. LEVEY	A. MACDONALD	J. P. MACDONALD."
F. M. SMALLS.		

Resolved:—“(a) That the communications received from the Association of Unregistered Dentists and others, be acknowledged, and that the Memorialists be referred to the following *Resolution*, passed by the COUNCIL on May 29, 1891:—

“That the By-laws or Orders of the Council which relate to persons who have commenced their Professional Education or Apprenticeship prior to the passing of the *Dentists' Act*, but have only completed it after the passing of that Act, and which By-laws or Orders dispense with the Certificates, Examinations, and other conditions for Registration in the *Dentists' Register* required under the general provisions of that Act, be hereby ‘revoked,’ so as to cease to have effect on and after July 22, 1891,”

“(b) That the Executive Committee recommend the Council to adhere to the said *Resolution* and to refuse the application.”

THE DENTAL HOSPITAL OF LONDON.

The Annual Dinner of the Staff and Past and Present Students was held at the Café Royal on the 30th ult. Mr. Frederick Canton presided. There was a very large attendance, and much enthusiasm of the right kind. After the loyal toast, the Chairman in submitting "The Past and Present Students," said that as an old student himself, he felt he was proposing his own health, but the Dean was immovable that the Toast must come from the Chair. He pointed out that if there were no students there would be no hospital; in their hands also lay the welfare and honour of the Profession. The seniors had carried on the fight in the past in the face of home and foreign quackery. Alluding to the good men turned out by the School, he said that the list of their past students showed that they held the large majority of hospital appointments.

Mr. Ackery, in response, contrasted the difference between the time when he entered the hospital, twenty years ago, and at the present. Mr. Hepburn who had just been appointed assistant-surgeon, and Mr. Bailey, the anæsthetist, were he believed, the only ones who were now connected with the Staff. The speaker also alluded to the labours of Sir John Tomes and Mr. Smith Turner. Much remained to be done, and so far as the Hospital was concerned, they must have a new building. He was able to point with pride to the amount subscribed by the Past Students. Such meetings like that helped to bind the Profession together. In concluding he expressed the opinion that no man was fully qualified until he became a member of the Odontological Society and the British Dental Association.

Mr. Pidgeon replied for the Present Students, expressing thanks to the Staff. He thought their School was the first in the whole world.

Dr. Coupland in proposing "The Hospital and School," spoke of the merits of the hospital situated as it was in the Square where Hunter taught and Reynolds painted. He thought the Public would appreciate the efforts made; any founder might reply *si monumentum quaeris circumspice*. His first visit to the Hospital many years ago was a pleasant memory in connection with "gas." The gates of Paradise were opened by Mr. Bailey—a kind of arch-angel. Memories of pleasure lasted longer than those of pain. His second

visit was paid a few hours ago in the company of Mr. Lloyd Williams. He could understand the difficulties of the work in comparison with medicine and surgery. The dentist must be an artist as well as a man of science. Their building must soon be changed, and they must appeal to the British Public ; perhaps they might meet with a South African millionaire. Their institution in the past in spite of its limited accommodation had afforded relief to many thousands, but there was also the educational aspect. These could not be separated, and the philanthropist would see this.

Dr. Joseph Walker, the Treasurer of the Hospital, in reply, said the Hospital and School were married thirty-seven years ago, and that was their anniversary wedding-day. The negotiations for the new site were going on favourably, and they were within measurable distance of seeing the foundation-stone laid. He had an offer from a friend, and all that was required was £3000 to pay interest on loans. He had no further appeal to make to Past and Present Students, but one to the Public should be made, and he advised his hearers to imitate the methods of the Church ; they all had a dental pulpit in their surgeries.

Mr. Matheson responded for the School. He especially mentioned the services rendered by the Dean (without whom the School would have been a very different place) and by their energetic secretary. There was a good deal of difficulty for the Staff in the material they had to deal with, a large proportion of students were not fit to be dentists. There was plenty of room for all the Schools ; wholesome emulation and friendly rivalry were a good stimulus. They all strived after one great thing, to turn out practical men who should do good sound work in a proper way for their patients.

Mr. W. H. Dolamore proposed "The Visitors," for whom Mr. Ernest Lane responded.

Mr. J. Smith Turner proposed the health of the Chairman in complimentary terms, recalling the numerous offices and posts which he had occupied in the Dental Profession.

Mr. Canton in reply said he owed much to the true and staunch friends who had surrounded him.

During the evening an excellent Programme of music was given under the direction of Mr. Herbert Schartau, Mr. Charles Capper, *Le Siffieur*, and Mr. W. G. Churcher, with some exceedingly humorous recitations, shared also in the honours of a most enjoyable gathering.

QUEEN'S BENCH DIVISION.

(Before Mr. Justice Mathew).

COMER v. GWYNNE.

Mr. Frank Comer, described as a specialist in advanced American dentistry, practising at 9, Hereford Square, South Kensington, sued Mr. John Gwynne, engineer, carrying on business at Cannon street and Hammersmith, to recover £105, the cost of supplying Mrs. Gwynne with a patent removable bridge case in duplicate containing four teeth. Defendant denied that there was a contract, and pleaded that the plaintiff's charge was excessive.

Mr. R. M. Bray appeared for the plaintiff; while Mr. Macaskie represented the defendant.

Mr. Bray stated that the plaintiff's speciality was removable bridge work in duplicate. The advantage of this work was that if anything happened to the bridge work it could be unscrewed and the duplicate fitted. In July, 1894, plaintiff did some work for defendant, and in the following May he received a letter from Mrs. Gwynne asking for an appointment. An appointment was made, and the defendant and his wife called upon the plaintiff. Mrs. Gwynne had a broken bridge case which had been put in by some London dentist, and she desired to have it removed and replaced by something newer. A question arose about fees, and plaintiff told the defendant that he could not tell exactly what the charge would be until he knew precisely what work had to be done. He, however, pointed to his book of fees, and stated that his terms would not, at any rate, be higher than those there mentioned. The book in question stated the prices of the different classes of work in dentistry. Subsequently Mrs. Gwynne called again and plaintiff on that occasion, after examining her mouth, told her that her case was broken, and she said she would have a new case. Plaintiff then told her that she could have four teeth on a fixed bridge at fifteen guineas per tooth, or four on a removable bridge in duplicate at twenty-five guineas per tooth. Mrs. Gwynne selected the latter, and plaintiff executed her order. After the teeth had been made, Mrs. Gwynne refused to take the duplicate or to pay the plaintiff's charges. On the same day that the teeth were fitted, the plaintiff sent in his account:—

“To agreed price for professional services rendered for Mrs. Gwynne, and supplying four-tooth removable bridge-case in duplicate, £105.”

The defendant then wrote to the plaintiff that the plaintiff agreed to do the work on the same lines as he worked for defendant—namely, £31 10s. for seven teeth. The plaintiff refused to alter his account, and brought his action. Plaintiff had previously done some work for the defendant for thirty guineas, which was a reduction of his usual fees, made because he thought that the defendant would be able to introduce other customers.

Mr. Frank Comer, the plaintiff, examined, said he was a specialist in advanced American dentistry. He practised at 9, Hereford-square, South Kensington. In July, 1894, he had a communication

with defendant. and agreed to do the work for 30 guineas. The defendant had a fixed bridge-case broken in upper jaw. He agreed to make a small case for his lower jaw and repair the broken case. The case was made of gold and platinum. The platinum screws were screwed into the old stumps. By unscrewing the bridge it could easily be removed. He gave the defendant one of the books showing his prices. The defendant's wife told him she had a broken fixed bridge. He looked at her mouth and said he did not know what it would cost, that defendant knew what his regular printed fees were, and he should not charge more. The defendant's wife said it would be all right, as witness would charge only what was fair. On May 8 Mrs. Gwynne came. He removed the broken bridge which was difficult to remove. He then picked up one of his pamphlets, opened it at his list of fees, and said, "It now rests with you to decide what you wish to have done. If I put in a four-tooth case with a fixed bridge it will be 60 guineas: if with a removable bridge case in duplicate it will be 100 guineas." Mrs. Gwynne said she wanted the best. He said, "Very well, it will cost you 100 guineas." He was occupied on the case from Wednesday to Friday almost continuously.

Cross-examined:—He had a diploma from Central America. Removable bridge-work had never been done by any dentist but himself. He charged £31 10s. for two or three hours on May 8. On May 10 she was with him about three hours. He never made a removable bridge-case unless he made a duplicate set. Mr. Gwynne did not agree that the price was to be 100 guineas. He suggested that Mrs. Gwynne did not know the meaning of the word duplicate. Mrs. Gwynne refused to accept the duplicate bridge.

That closed the plaintiff's case.

Mr. Macaskie for the defendant said his case was that there was no bargain to pay 100 guineas: that the defendant was not party to any such bargain; and that the charges were excessive and unreasonable.

Mr. Gwynne, the defendant, called, said the plaintiff told him he could not exactly say the price. The plaintiff said he would do the work for his wife on the same lines as his own. He never agreed to pay 100 guineas or authorised his wife to agree to those terms.

Cross-examined.—He saw the testimonials with the price list.

Mrs. Gwynne, wife of the defendant, gave corroborative evidence. She denied that she agreed to pay plaintiff £105. When plaintiff brought in the duplicate she told him that her husband would not pay for it. Three days after the teeth had been fitted one of them came off while she was partaking of lunch or dinner. The plaintiff did not supply her with a key.

Mr. Bray:—The key is with the duplicate which you did not take away.

Miss Allen, called, said she was with Mrs. Gwynne at the plaintiff's. Nothing was said about terms.

Mr. Charles Tames, F.R.S., examined, said he was a consulting dentist. Had been examiner at the College of Surgeons on dental surgery for 13 years. He had examined Mrs. Gwynne's teeth. The work was very ordinary, and was done by hundreds of dentists here and in America. It was an average piece of work. For one set a fair charge would be from 15 to 20 guineas, but it was difficult to

answer the question, as most dentists charged by time. Two guineas an hour was the recognized charge for dentists in first class practice. That was while the patient was with the dentist. A good deal of the laboratory work could be done by a skilled artisan. For the duplicate set he would say ten guineas was ample. The duplicate set was not required,

Cross-examined.—He thought the charges in plaintiff's book most extortionate. He thought some of the statements in the plaintiff's pamphlet showed great ignorance of anatomy and physiology. He did not look upon the plaintiff as a professional equal. He had often made removable bridge plates. The principle was not new. There was no such thing as dentistry special to a country. There was no jealousy between English and American dentists, when they practised on professional lines.

Mr. W. B. Paterson, honorary secretary to the British Dental Association, examined, said,—He was a practising dentist. He agreed with Mr. Tomes as to the charges being excessive.

Cross-examined.—He had made several removable bridges. He did not know of the Comer system.

Counsel addressed the jury.

Mr. Justice Mathew, in giving judgment, said that the true explanation of the action was that the plaintiff believed that because he put his price list in Mrs. Gwynne's hand, she therefore, must be taken to know what was in it. What were the probabilities about that? The defendant had been attended to by the plaintiff, and for the work he did he was willing to take 30 guineas. The defendant said he went to see what the charge for his wife would be, and was told on the same lines as his own. If the evidence in the case supported the defendant's version, and not the plaintiff's, what occurred subsequently? The plaintiff put the book of charges into Mrs. Gwynne's hand while sitting in the chair. He was satisfied that the plaintiff did not call the attention of the lady to the charges. He advised the plaintiff if he meant to make such a charge as this to write first to the person he intended to make liable. He had evidence of men of experience called before him, who stated that there was nothing unusual or extraordinary in the work done by the plaintiff. He would allow him 30 guineas, and direct that the remaining 20 guineas paid into Court be paid out to the defendant, with costs of the action.

AN AMERICAN DENTISTS' ASSOCIATION.

At West Ham Police-court, Arthur Warren, described as of 24, Woodgrange-road, Forest-gate, was summoned before Mr. Baggallay, by Mr. G. R. Matland, a dentist, of 265, Romford-road, Forest-gate, for unlawfully taking and using the title of "dentist," implying that he was registered under the Dentists' Act of 1878.

Mr. Fred George prosecuted, Mr. Wildey Wright defended.

Mr. George said the proceedings were taken under section 3 of the Dentists' Act, the defendant having taken and used the title of dentist, but was not registered. The American Dentists' Association had a branch at 22 and 24, Woodgrange road, where the defendant practised, and the circulars of the Association had the name of H. J. Bradlaugh as the senior dental surgeon, and that gentleman's name was on the register.

Evidence was then called showing that on Nov. 26, a Mrs. Elizabeth Parnell and a Miss Rebecca Beal, both in the employment of Mr. G. R. Matland, called at 22 and 24, Woodgrange road, and were shown into the surgery from the waiting-room by the defendant. Mrs. Parnell asked, "Are you the dentist?" and he said, "Yes, I am the dentist," and when asked if he was Mr. Bradlaugh he said, "No, Mr. Bradlaugh is my senior partner." She asked about three teeth, and had impressions taken for two teeth, and paid 2s. 6d., for which she received a receipt. This was headed, "The American Dentists' Association," chief offices, 6, Grosvenor street, W., and bore the name of H. J. Bradlaugh, as senior dental surgeon. Mrs. Parnell called at the place later on, but saw no one, and in the evening Mr. Matland called and asked the defendant if he was a dentist. The defendant said "Yes," but when asked the date and nature of his qualification, as his name was not on the Dentists' Register, he said, "I am not registered in this country; I am an American dentist." He was then told that proceedings would be taken against him.

Henry William Cottell, a registered dentist, of Hastings, was called for the defence, and said that he acted at Woodgrange road as locum tenens for Mr. Bradlaugh, the manager of the American Dentists' Association. The defendant was in the service of the association as a mechanical dentist, and there were cases in which mechanical dentists took impressions of the mouth and with ability. The witness, however, always saw the work, and Warren made appointments for him to go to Woodgrange road. He (witness) had gone there three, four, and five times a week.

By Mr. George.—He had charge of the Grosvenor street branch and the Woodgrange road branch. Mr. Bradlaugh also attended, and he also carried on business in Dublin. There were no other registered dentists outside Mr. Bradlaugh employed.

By Mr. Baggallay.—He last saw Mr. Bradlaugh at the end of October. He had had no communication with him in connexion with this case; he was communicated with by Mr. Piper, the secretary, who was in court. The witness had no fixed day or days for attendance at Forest-gate. He went there only by appointment.

Mr. Baggallay.—If you have no fixed day, how can Warren make appointments for you?

He would write to say he had made an appointment for a certain time to see a patient.

Mr. Baggallay.—Can you tell me when last you were at Woodgrange road prior to November 26?

I am afraid I can't.

Mr. Baggallay.—Can you give me a single date or instance when you attended a patient there?

No, I can't remember one.

Mr. Wildey Wright said he would call no other witnesses, and in

the course of his defence said the American Dentists Association was composed of qualified practitioners, who employed assistants to begin the work, which was supervised by the qualified practitioners. On the facts he submitted that the witnesses were wrong in stating that the defendant said he was "the" dentist, but whatever he said he had a perfect right to do what he had done.

Mr. Baggallay said that the sole question was whether the defendant used the name of dentist, and if he did so whether he was entitled to by reason of being properly registered. It was clear he was not registered, therefore the question was did he use the name. If this was a *bona fide* association either the manager, Mr. Bradlaugh, or the secretary of the association would have been called to explain how it was worked. It was a very extraordinary thing that the secretary should be actually in court and not be called as a witness. The only witness called for Mr. Warren was a gentleman who represented that appointments were made for him, and he went down to Woodgrange road and saw patients; but when challenged to show his books or a letter, or to give an instance, he was unable to quote a single item in corroboration. Therefore he (Mr. Baggallay) came to the conclusion that the whole association was bunkum, and the defendant was not a dentist, but that he represented himself to be a dentist. The fine would be £10 and costs. He (Mr. Baggallay) must say a word about the rivalry Mr. Wildey Wright had made such a lot of. Mr. Matland was perfectly justified in taking these proceedings, finding, as he did, that this man was not registered, and was thus carrying on unfair rivalry.

Mr. George asked for professional costs, and £2 2s. were allowed.

Mr. Wildey Wright suggested that he might possibly appeal.

FITTING CROWNS.—Dr. Bryan, in the *International*, gives the following method of preparing an opaque black wax for articulating crowns. One part by bulk of lamp black and five parts white or yellow wax are mixed together and rolled into sticks. The crown and root being ground to fit approximately, a small piece of this wax warmed is placed around the pin and the crown placed in position. The points requiring grinding will be accurately indicated. The amount to be removed being estimated by "sounding" the wax with a fine point.

VACANCY.

Birmingham Dental Hospital, 71, Newhall Street, Birmingham. The post of House Surgeon is vacant. Applications to be made to the Honorary Secretary.

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